RAILROAD GAZETTE

FRIDAY, FEBRUARY 17.

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NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

Meetings Next Week.—Delaware, Lackawanna & Western.—Louisville & Nashville.—New York & Boston Rapid Transit.—New York, Susquehanna & Western.—Northern Central.

Elections.—Atchison, Topeka & Santa Fe, S. B. Burke, General Freight Agent.—Atlantic & Pacific, A. A. Gaddis, General Superintendent.—Augusta & Chattanooga, C. A. Evans, President.—Birmingham, Selina & New Orleans, A. H. Jones, President.—California Southern, D. McCool, General Manager.—Duluth, Northwestern & Winnipeg, R. S Munger, President.—Kansas Valley, Thomas A. Osborne, President.—Moncton & Batcuche, Louis de Bertram, President.—Ohio & Northwestern, George West, President.—Pittsburgh, Shenango & Lake Erie, M. P. Frost, President.—Quincy, Omaha & Kansas City, C. H. Ball, President.

New Companies Organized.—Choctaw Railroad & Coal Co. is chartered in Texas—Danville & East Tennessee files articles of incorporation in Virginia.—Danville & North Carolina chartered in Virginia.—Hutchinson, Ashland & Neutral Strip files charter in Kansas.—Los Angeles, Colton & Eastern incorporated in California.—Pensacola Short Line files charter in Florida.—St. Louis & Springfield files articles of incorporation in Illinois.—Waukena, Tulare & Mammoth Forest files articles of incorporation in California.

Changes and Extensions.—*Alabama:* Alabama-Great Northwestern is located to Maplesville. Anniston & Cincinnati complete to Alexandria. Nashville, Florence & Sheffield completed to Ironton. Pensacola & Selma commences work between Pineapple and Keptor.—*Arkansas:* St. Louis, Iron Mountain & Southern commences survey from Hot Springs west.—*Indian Territory:* Denison & Washita Valley, survey to Lehigh nearly completed. St. Louis & San Francisco begins survey from Sapulpa.—*Louisiana:* East Louisiana completed to Claiborne. St. Paul, Alexandria, Jennings, Lake Arthur & Gulf will begin survey.—*New York:* Rochester & Honeoye Falls will be extended to Hemlock Lake.—*Ohio:* Ohio & Northwestern will be completed to Gallipolis.

Traffic.—Anthracite coal shipments for the week ending Feb. 11 show a decrease of 2.5 per cent., as compared with the same period last year; bituminous shipments show an increase of 20.4 per cent. Cotton receipts, interior markets, for the week ending Feb. 10 show a decrease of 24.3 per cent. as compared with the corresponding week last year; shipments show a decrease of 8.9 per cent.; seaport receipts show a decrease of 7.9 per cent.; exports an increase of 1.9 per cent.; cotton in sight is greater than at the same date last year by 5.7 per cent.

Earnings.—For the month of January one hundred and one roads report gross earnings, thirty-seven showing a decrease. The net increase is $799,523, or 3.9 per cent. For the month of December eighteen roads report gross and net earnings, five showing a decrease in gross and six a decrease in net. The gross earnings show an increase of $573,418, or 5.8 per cent.; and the net earnings a decrease of $618,692, or 14.8 per cent.

Miscellaneous.—Kansas City, Fort Scott & Springfield files articles of consolidation.

Contributions.

Bending Rails in Fast Tracklaying.

BROOKLYN, Feb. 2, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I should be glad to learn the manner in which *steel* rails are curved in the cases of rapid tracklaying in the far West and Southwest—when 2 to 4 miles are laid per day. Perhaps some of your readers will be able to furnish the information.

In the old days of quick work upon the Union Pacific, when steel rails were hardly heard of, the rails were quickly bent for any curve encountered with a lever and a few blows of a heavy sledge; or still more quickly by raising the rail as high as convenient, and dropping it so that it would strike near its ends in falling. Any such treatment of steel rails is, in the East at least, almost universally condemned. When 3 or 4 miles per day are being laid, everything being brought up by trains from the rear, there is little time for fooling in bending rails. It is doubtless the case that on many western roads where track has been laid so rapidly, the line runs for long distances over the plains where the tangents are long and the curves few and far between. But this has not always been the case, as for example on the Canadian Pacific, where over 6 miles were reported as having been laid (in 1883) in one day of 14 working hours, there being on this 6 miles 5 curves (length not stated) "requiring the cutting of 15 rails."

Now, in such cases are the rails curved by some bending machine before they are sent out, are they brutally treated in the same way as in the old days of iron rails, or are they possibly laid in the track without curving them at all? How is it?

One other question. A very ingenious French rail bender, quite portable and, to judge from its appearance, a very quickly acting and effective machine, was illustrated in the *Railroad Gazette* for 1882, p. 511. Has this machine ever been introduced into this country, and, if so, with what success? The machine alluded to is in two parts, each gripping one end of the rail. These parts are connected by a chain, which, by a worm gear (if I remember rightly), is wound up so as to become the chord of the curve taken by the bending rail.

A little practice should enable the men handling it to judge how much to allow in bending the rail, so that when released it would, after springing back, retain the required curvature. F.

[As a matter of fact, our correspondent is correct in supposing that the recent fast tracklaying has been on straight lines or lines of light curvature where no bending has been done. On the line from Minot to Great Falls, for instance, where last year 643 miles were laid from April 2 to Nov. 18, the maximum curves were 3 degrees and no rails were bent.—EDITOR RAILROAD GAZETTE.]

Buffer and Momentum Brakes.

NEW YORK, Feb. 11, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your very candid and able criticism on "Buffer Brakes" in your last issue meets with my entire approval in so far as it relates to any of the momentum contrivances that have, to this date, been exploited. But I do not agree with your view of the *probable* impossibility of perfecting the type until it becomes acceptable to railway managers. Any momentum brake can be made "automatic" in the sense in which you use the word, by the same means resorted to by Mr. Westinghouse, to wit, by a special brake coupling; say a string from each car to the preceding one, which shall first put on the brakes and then break, whenever a breakaway happens! And there are at least three patents for automatic momentums that apply brakes in case of breakaways *without use of special couplings*.

As to "shock;" given close couplings and a lever-momentem that is operated from the *after follower* of the draw-gear, and it may be predicated as no more likely to occur than with the Carpenter electric or Westinghouse compressed air. Momentum brakes exist, two at least, that are *perfectly* automatic as against "pushers." And most "momentums" can be applied upon backing trains by the use of the hand-brake on the caboose. As to "graduation" and the power to stop the train elsewhere than in the cab, momentum advocates can make as good a showing as is possible for connected brakes, and there are many particulars in which the independent brake system is vastly superior to any possible connected one.

If we may suppose a buffer system which is entirely and absolutely *automatic*, which has and needs only the usual traction coupling between cars, which has no connection with the trucks or axles, and no relation to or dependence upon speed or direction, which receives no impulses except from the buffers, nor communicates any except to the brake beams; which requires no instructions for its use, nor any change in car or train management; and which is cheaper and more cheaply maintained than any connected system; all of us would favor it. Such a system can be produced—and, if you choose, you can for yourself examine it, and can illustrate and describe it in your journal—although not yet upon the market. W. B. GUERNSEY.

[It is, of course, impossible to criticise Mr. Guernsey's assertions as to the manner in which a device not yet made public may act, but the statement that any existing buffer or momentum brakes can work without shock, can be graduated, and are automatic, will be read with surprise, especially by those who have most carefully studied this question.—EDITOR RAILROAD GAZETTE].

The Proper Length of Dead-blocks.

COLUMBUS, Ohio, Feb. 6, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The Timms Car Coupler Co. agree with the statement made by Mr. Lorraine in the *Railroad Gazette* of Feb. 2 in regard to the length of the draw-bar stem, and also in regard to there being couplers now in the market that do not necessitate the present dead-blocks now in use on cars being thrown away.

To replace the present dead-blocks would necessitate a large expense to the railroads, and if done to satisfy the dimensions of one draw-bar now in the market would not be showing courtesy to others now in the field. The ones I refer to are so constructed that they will stand against breakage with or without dead-blocks.

The cuts in your advertising columns representing this coupler will convince any one who will examine them as to their strength and durability.

JAMES TIMMS.

Advance Orders.

ATLANTA, Ga., Feb. 13, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to the communication signed "Superintendent" and your editorial on "The Duplicate Order System," in your issue of Feb. 10, I would like to say, in support of "Superintendent's" ideas, that the system suggested by him not only can be, but is successfully used on a 1,450-mile railroad system, one of the systems centring here. The road referred to uses, and has for three years used, Rule 510 exactly as recommended by the Time Convention, but adds the following note: "Under no circumstances will the 'complete' be given the inferior train before it has been given the superior train unless the superior train shall have received 'complete' orders to 'get orders' at the station in question, or equivalent in conjunction with the 'O. K.' given the operator. *Dependence must not be placed on the 'O. K.'d, or holding order alone to hold superior train.*"

This simply means that the rule is to be regarded as though the words "whenever practicable" did not exist. Under this construction, a dispatcher has to lay his plans much farther ahead than where he has only to place his order with the operator and trust to a red signal—which may or may not be displayed—to hold a train with unrestricted rights. When the dispatcher sees that there is a probability that he will have occasion to curtail the rights of a ruling train, he at once places an order "blocking" his train at any desired point. After this order to "get orders" has been signed, he places his order, *in duplicate*, to both trains—placing it for the ruling train at the point where he has it blocked, or at some point *before* that point is reached. This latter would be done in order to save the "blocking" point for some other movement or to avoid the necessity, perhaps, of placing two orders for one train at the same office. The restriction of the ruling train's right must, of course, take place after the train has passed the station at which the blocking order is given. Should the train not be wanted for orders at the point at which it is "blocked" it is released by an order, regularly signed and completed, reading "no orders." There should be no more likelihood of two orders being placed at one and the same point under this rule than under the "whenever practicable" construction of Rule 510, as recommended by the Time Convention. As this manner of moving trains is being and has been for over three years successfully used on one of the leading systems of the South, it is safe to assume that there can be no reasonable question as to its practicability.

DISPATCHER.

Train Lighting in Germany—The Manufacture of Gas.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In an earlier letter I gave you some data of the cost of making gas for train lighting in France and of the system of premiums and allotments in use there [*Railroad Gazette*, p. 727, 1887]. It was stated in that letter that a great variety of oils and fats is used, according to local conditions, and that in France the gas is made from rape seed oil, Scotch shale oil or a bituminous oil from Autun. In Germany a brown coal tar oil is generally used.

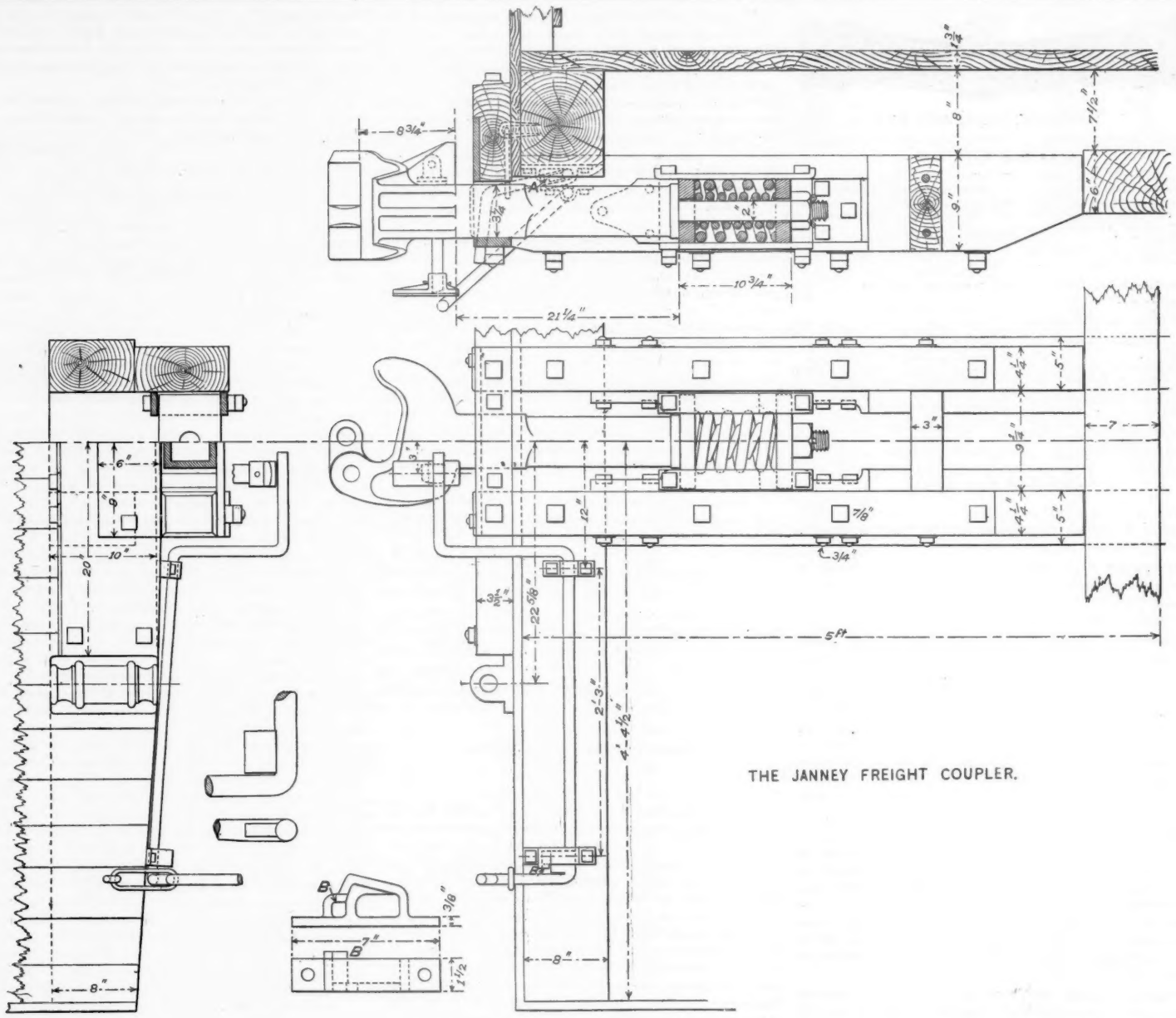
Of course the amount and the illuminating power of gas made from the several oils vary considerably, yet not as much as one would think at first sight. For example, the brown coal tar oil will yield 893 cu. ft. per hundred pounds; crude petroleum and shale oil, 968 cu. ft., and naphtha, 913 feet. Careful experiments with the photometer give the following illuminating power of the gas produced, taken on the basis of one burner consuming one and one-half cubic feet per hour and under a pressure of a three-quarters of an inch water column for brown coal tar oil, and an inch column for the others:

	Candles.
Brown coal tar oil	13.5
Crude petroleum and shale oil	10.5
Naphtha	10

The French roads receive $8.40 per ton for their tar and $2 per hundred pounds for the volatile benzines which come from the compression of the gas. The amount of tar produced varies from 30 per cent. to 35 per cent., according to the oils that are used. With the exception of the tar there is very little refuse, merely some slight carbon deposits in the retorts that are worthless.

The fuel consumption for the volatilization of 100 pounds of oil remains tolerably constant. It is preferred that no coal shall be used, on account of the bad effect which the contained sulphur may have upon the red-hot iron of the retorts. Coke or wood is used where it can be obtained. It can be given as an average statement that 1,000 cubic feet of gas can be made with 135 pounds of coke or 15 cubic feet of hard wood. In Germany the men get from 65 to 75 cents per day of 12 hours; in France they are paid from $1.15 to $1.40, while in America the same class of labor would probably be paid from $2 to $2.50 per day.

In the German practice each retort may be taken as capable of producing about 425 cubic feet per hour. The manipulation of the apparatus is so simple, merely requiring



THE JANNEY FREIGHT COUPLER.

careful attendance, that many of the difficulties of ordinary gas making are removed. The oils and greases that may be used, require no previous preparation, so that the workman receives all of his materials ready to his hands.

An improvement has recently been introduced that will somewhat lessen the cost of the gas to those companies that have no facilities for disposing of the waste products. A furnace has been designed for burning the tar which is given out as a by-product of the gas. The furnace is so simple and primitive in construction that it almost requires an ocular demonstration to convince one that it will work. The tar is fired in a plain cast-iron pan; the air is admitted over its surface; the passages beneath are closed, and over it is a fire-brick wall through which a number of long narrow flues pass. This wall or roof is really the key to the whole arrangement, and the flues must be of just the proper shape and size, and be in exactly the right position or the fire will not burn. When these details had been properly attended to, however, the designers were themselves astonished at the results obtained. Locating the retorts over the wall and allowing the hot products of the burning tar to circulate around and between them, it was found that there was a far greater uniformity in the heat of the retorts, that there was no cooling off on account of the firing, and that the quantity of gas produced per hour was increased. The tar requires only a slightly higher chimney than the coke, and then, strange to say, it burns without smoke. Naturally the fire is all on the surface of the tar, which lies in the pan, and is constantly replenished by a stream from a tank outside. While this system is new and has not yet been extensively applied, the experiments and tests have been carried far enough to show that, in all probability, any oil will produce tar enough to run half the number of retorts that are kept in operation.

In the United States the system of lighting by gas has to meet and compete with the firmly established kerosene lamp. That it is safer there can be no doubt, and I think that I could prove that it is cheaper. Now, however, I will only ask you to consider the fact that the German roads are using the Pintsch system on between twelve and thirteen thousand cars. But they cut off and trim down expenses in every way, they have no competition to fear and are forced into no progressive action, and it is to be presumed that they are using the gas light because it is the cheapest, and not alone because it is the safest and best. G. L. F.

[From late experience of railroad works producing gas for train lighting, we find that about 1,500,000 cu. ft., produced in the month of December, cost $1.77 per cubic foot. The greater the capacity of the works, the less the cost of the gas, generally. The oil used cost about 4 cents per gallon. Twenty burners, giving 175 candle-power of light, will consume per hour about 13 cu. ft., at a cost per car-hour of 2.3 cents for effective lighting.—Editor Railroad Gazette.]

The Union Pacific and the Government.

To the Editor of the Railroad Gazette:

The following remarks are suggested by your article of Feb. 3, on the Pacific Railroads, considering the various plans that have been proposed as substitutes for the Thurman act, under which the roads are now working: they are intended to deal with these plans in so far as they concern Union Pacific alone.

I. "To sue the old management." There are no grounds for such a suit. The management of Union Pacific has been shown, by the testimony of railroad commissioners and government directors, and by the record of numerous investigations, to have been unexcelled for its honesty by that of any railroad company in the country. The road has always been managed in the interest of its stockholders, and not for the benefit of the directors, at the former's expense. As to the branch lines, whether they proved profitable or the reverse, they were built or acquired for the benefit of the stockholders. The only three lines of any consequence in which the Union Pacific directors had an individual interest before these lines became a part of the system, were the Kansas Pacific, St. Joseph & Western and the Denver & South Park. In the latter road Mr. Gould was the only one who had any ownership. The two first-named roads are shown by the records of the Commission to have resulted in a large profit to the company, which would have justified their purchase on higher terms than those made. The purchase of the South Park road was justified by the then existing conditions in Colorado and the prospect for the future, though it has proved a burden to the company. The working majority of the Executive Committee of Union Pacific has been made up of Boston men for many years, including those of Mr. Gould's ownership in the property, and, as a matter of fact, the same interests that carried the road to completion have ever since had, and now have, the controlling voice in its management. It is true that Mr. Gould had at one time an overwhelming interest in the property, but it never caused him to seek to carry any point for his personal benefit against the interests of the company; the men of whom this committee was and is now composed were honest in working in harmony with Mr. Gould, whose desire was to give a value to the property; they are equally honest now in working with Mr. Adams, who was not brought to the presidency of this company by an adverse interest, but by the wish of this same old management. Mr. Gould being wise enough to foresee the effect that the course of the Government and the completion of rival roads would have upon Union Pacific, had disposed of his interest long before the action of Congress in 1884, which, but for the personal credit of this management, would have made a temporary default in the payment of interest inevitable.

II. "To increase the percentage requirements under the Thurman bill." This, as you say, would seem to be an action that would not receive the sanction of the Supreme Court. This bill was decided to be constitutional by a majority of one; two seats being vacant at the time. One of the dissenting justices is reported to have said that he expected to live to see this decision reversed. Any act increasing the amount required under the Thurman bill would at once give the company the opportunity of bringing the whole matter into the Supreme Court again.

III. "To declare the charter forfeited, and reorganize the roads at once." This proposition is of course uncalled for, and beyond the law of the land.

IV. "To extend the time of payment of the debt." Without stopping to consider your figures in regard to the present and future value of the debt, in which you are perhaps in error, it is probably a fair statement that no plan which looks to the absolute payment of the debt by a system of fixed payments would contemplate an annual payment of less than $1,500,000. On this basis, the road would on last year's business have about four per cent. left for its stock, with no margin of surplus. This, of course, would be an unsafe plan in its working, as the past year has been a good one. It is well to remember that the company cannot, perhaps, be compelled to accept any of these plans against its will. Any requirements forced upon it that it cannot carry out without giving up dividends on its stock can have but one result. Union Pacific will eventually play the part of a wrecker of its own property, and of that of other roads. The possibilities which it offers for such business will be appreciated by any one who has studied the railroad geography of the West, and who remembers the part that the Denver & Rio Grande was made to play in the hands of able New

Yorkers in 1883 and 1884. Congress should study to avoid offering any such opportunities to Wall street. Your plan, which seems to be an equitable modification of the bills now before Congress, clearly points out the line of action which must be pursued if the stability of the Union Pacific and its rival systems is to be considered. By this plan the United States will realize the best possible results, as its first aim is for the prosperity of the company, in which the Government will share, by means of the extra payments based upon the amount of dividends declared. The small fixed annual payment will, in all probability, insure a moderate dividend, at least, to the stockholders, which is the one thing requisite to secure a good management. Even such a plan as this will be useless unless the company is allowed to manage its property in its own way; building branches and making such consolidations and arrangement with other roads as its managers consider beneficial. Any limitation of its powers in this respect will simply help other roads at the expense of Union Pacific.

C. M. B.

[The position taken by our correspondent is nearly the same as our own with regard to the policy which should at present be adopted. We have not the space to argue in detail the questions relative to the past management of the road.—EDITOR RAILROAD GAZETTE.]

NEWTON, Ia., Jan. 31, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Be kind enough to point out *where* in the amendment of 1864, of the Act of Congress of 1862, authorizing the construction of the Union Pacific Railroad, "the companies were relieved, for the time being, from the obligation to indemnify the United States for the interest which it was called upon to pay," or how "Congress, in other words, waived the right to recover that interest until 1897, when the principal would become due." And what is the ground for saying "there is reason to believe that Congress did not expect that the United States would ever be repaid in full?"

Even if in 1864 the belief were universal that the Pacific railroads would never be a success, and therefore never have the *ability* to redeem its pledges, would that be an apology for failing in such redemption, *being able?*

Does the belief of certain facts warrant a sentiment in favor of what is absolutely wrong?

Of course if one have a debtor who is "execution proof," he can, without "compounding a felony," make the best terms possible in the collection of all or even a portion of the indebtedness, and this is probably the situation of the United States in regard to its debtors, the Pacific railroads.

It does not follow, however, that they *ought* not to pay if they *can;* nor should the public or the press give a quasi assent to the "defense" of those who have *always* controlled the Central Pacific and *always* reaped the full benefit of their peculiar methods.

A.

[The real reason why the Government cannot enforce its claims is found not in the Acts of 1862 and 1864, but in the charter of the road and the interpretation given to it by the Supreme Court in the case of *United States vs. Union Pacific.* But of course the provisions of the acts of Congress have much to do with determining the form of the charter. In this respect the law is more significant for what it does not contain than for what it does. Congress waived the right to foreclose for default of interest, not by any positive clause in the act, but by the rejection of amendments which would have insured the Government that right. We were in error in saying that this right was not thus waived until 1864. It was done two years earlier, and this makes the company's case all the stronger. Congress had allowed them in advance to frame a charter which should exempt them from being compelled to pay advances of interest as they accrued. The most explicit instance was when Representative White, of Indiana, offered an amendment giving the Government the power to collect such advances of interest. He said that it was important to know what was the intention of Congress in this matter, that the law was at present loosely drawn and he wished to make it specific. The amendment was rejected.—EDITOR RAILROAD GAZETTE.]

The Janney Freight Coupler.

The accompanying illustrations represent the latest form of the Janney coupler as used on freight service.

The coupler is shown by a longitudinal section through the centre of the car, by an inverted plan, and by a cross section. Detailed views are also given of the rest or catch, used with the handle for working the locking pin.

It will be observed that the lines of the coupler are practically unaltered, and that the only modification introduced has been in the locking pin and the manner of operating it. A round rod beneath the sill is now used instead of a lever above the coupler. This rod can be more easily made by an ordinary blacksmith, and, being beneath the sill, is well adapted for use on platform cars. A piece marked *A* in the illustration is welded into the bend of the rod, and when the locking pin is lifted not to couple, the piece *A* lies on the shelf *B* in the guide placed on the under side of the end sill near the corner of the car.

The rod lifts the locking pin, as shown. The pin is made square in cross section and heavier than before, the weight complete being now 10½ lbs. A spring is therefore unnecessary as an auxiliary to force the pin down, and the locking is now effected by gravity only. The pin falls 3 in., or a considerably greater distance than before, and consequently has a greater bearing surface on the knuckle, locking it more effectually. The under side of the pin butts into a recess in a cast-iron plate. This makes a simple connection and dispenses with any links and pins, with their attendant fitting and friction.

The distance from the face of the deadwood to the inner, or coupling, face of the knuckle is 8¾ in. The use of 9-in. deadblocks would therefore keep the couplers from being driven completely home, and would keep the deadwoods 18 in. apart. The distance apart of the car bodies depends, of course, on the thickness of the deadwoods. In the car illustrated these are 3 in. thick, and, therefore, if 9 in. blocks were added the car bodies would be 24 in. apart when the drawsprings were compressed. If outside sills or end platforms were used this distance would be increased proportionately.

Wheels, Axles and Track—New England Railroad Club.

The usual monthly meeting took place at the Boston & Albany depot, Boston, on Feb. 8.

The President, Mr. J. N. LAUDER (Old Colony), occupied the chair, and announced as the subject for discussion for the evening "Wheels and Axles, and their Relation to the Track."

Mr. ADAMS (Boston & Albany): I can remember when there were no railroads here. When they were first introduced there does not seem to have been much system about them. A railroad was rather a local matter, and those who wanted one in their vicinity built it to suit themselves, not supposing it was to run any farther than from one city to another. Tracks were built of various gauges—4 ft. 8½ in., 6 ft., 4 ft. 10 in. Those who built them seemed to have an idea that by putting in these differing tracks they could control the business of the country and build up the places at each end of a track of a certain gauge. For instance, between Buffalo and Erie there was built a track 4 ft. 8½ in.; beyond that, west, they built a track 4 ft. 10 in., which was called the Ohio gauge. A track 15 miles in length was built 6 ft. wide between two tracks of narrower gauge, and a track to the south was 5 ft. Of course this made a great deal of trouble, as the cars transporting freight could only run upon the road to the gauge of which they were adapted. This led to the use of compromise wheels, to enable the cars to run either upon a 4 ft. 8½ in. or a 4 ft. 10 in. gauge, thus facilitating transportation.

The construction of tracks not being my specialty, I will not say much about that, but everybody will concede that the relation of the guard rails to the frogs and the relation of the wheels to these points are very important matters. We realize that it is important to conform to an exact distance in laying guard rails, also that it is of great importance to have the wheels drawn just as they should be in relation to the track. In early days, when roads ran independent of each other, each with its special gauge, it was thought by some that there should be a half inch lateral play between the wheel and the flange, by others that there should be five-eighths, and by others, three-quarters. The wheels were driven as near as they could be, according to the different plans, but there were not any of them very near. This variation is noticeable at this day, running from one-eighth of an inch to an inch, and it makes so much trouble that it has led to a demand for the adoption of certain gauges all over the country, and this undoubtedly is an important point. It is a question at issue between different roads as to what wheels shall be allowed to pass over certain roads, as to gauge; but it is observed that those roads which are the most careful in this matter have the least accidents, while those which go at loose ends and take everything which comes along are very apt to have accidents, in consequence of wheels taking the wrong point of the frog and getting on to the wrong track. We cannot be too particular in laying the track at the right gauge, and in placing the guard rails at the right points, and giving them the right distance, so that the wheels will pass through properly. When the compromise gauge was introduced, I was connected with the Lake Shore, the track of which was 4 ft. 10 in. wide, while the New York Central was 4 ft. 8½ in., and they insisted on running their wheels over our track, until a serious accident resulted, killing a great many stock and destroying a large amount of property. The result was that a change was made, and a positive gauge adopted, which remedied the trouble. Previous to that all that was supposed to be necessary was to increase the width of the wheel.

The PRESIDENT: There is a movement on the part of the wheel makers to bring about an understanding with the railroads in the matter of chilled cast-iron wheels, to get a uniform system of specifications for wheels, a uniform system of testing wheels, and also a uniform system, if possible, of selling and buying wheels, by giving guaranties, and also uniformity in furnishing wheels to railroads. It has been suggested that wheels should be furnished and paid for on a mileage basis, and I think we are coming to that in the near future. The matter stands in this way at the present time: A committee of car wheel makers, composed of six members, have met with committees from the Master Car Builders' Association and the Master Mechanics' Association, making a joint committee of 12 members. The have had two meetings, one in Chicago ten days ago, and have made substantial progress, and I trust that something will result of mutual benefit to the roads and wheel makers. We should use all effort to discourage the manufacture of poor wheels. A gentleman, not a wheel maker but a broker, told me in my office within a month that he had put in a bid for a lot of wheels for a freight car manufacturer, and quoted the price of $6.75. Now a wheel weighing 550 pounds should cost considerable more than that for material alone. The wheel maker and the car builder who sell and use these wheels deserve to be shot or put in prison.

Mr. LOBDELL (Lobdell Car Wheel Co.) read the following paper:

Of the many subjects of great importance for the consideration of railroad managers, which have a direct bearing on the destruction of property, the economical work of the road and the safety of passengers and employés, none are of more importance than the character of the wheels and axles used. Much false economy has been practiced by railroad companies in the purchase of both wheels and axles, and much loss would be saved if railroad companies were willing to pay a fair price for such articles when made of good material and of proper weight, and would buy only from manufacturers of experience—from those who use that degree of care and skill in the management of their business that is absolutely necessary to insure the production of a reliable article. Take the chilled wheel as an instance; as it now is, wheels made by parties of but limited experience are brought into competition with those made by old and long established makers (some of whom have made a life study of the business), and in order to effect sales they are offered at prices below that at which a good reliable wheel should be sold. Managers of railroads should visit the works and see for themselves the amount of knowledge and skill possessed by the makers of railroad wheels, the degree of system and care practiced by them in the manufacture of an article which requires "eternal vigilance" to secure success. No maker of railroad wheels should be patronized who is not conscientious and who does not appreciate the responsibility resting on him for the safety of property and the lives of passengers and employés. Judging from the character of many old wheels that I have seen broken, I think that the makers of them would not wish to ride in cars under which they had been placed if they knew their character.

When certain kinds of gray cast-iron are melted and poured against a metallic mold, that portion of the iron next to the mold becomes hard, white, crystalline and brittle, while the interior portion remains gray, and more or less fough and fibrous. This conversion of the part of the iron that strikes the metallic mold into the hard, white variety, is called "chilling," and it is upon this principle that the manufacture of chilled car wheels depends. Metallurgists tell us that when most cast irons are melted and cooled suddenly, the carbon in the iron is all retained in the combined form; but that if the cooling is effected slowly, it separates partly as free carbon or graphite; and the chief chemical difference between the chilled iron and the soft iron of the same wheel or other article cast in a metallic mold is in the carbon—that of the chilled portion containing it in the combined state, whereas that of the soft or gray portion, while also containing some in the combined form, has more or less of it separated in the shape of graphite. All irons do not possess this property of chilling. It is possible to have such an excess of graphite, carbon and silicon in the iron that, unless its chemical composition is materially changed in melting, it will not chill at all when run against a metallic mold. Other ingredients, such as manganese, phosphorus and sulphur, have more or less influence on the chilling properties of iron and upon its strength. Many kinds of iron that possess good chilling properties are not strong—have not that degree of tenacity necessary to stand the sudden shocks or blows to which railroad wheels are subject, nor sufficient elasticity to stand the expansion of the rim by the heating of the same from the application of the brake, which often occasions the cracking of the brackets.

A knowledge of the influence of these different ingredients on the character of the iron should be possessed by those who attempt to make chilled railroad wheels. It may be asked, How is it known that they are present, and whether they are present in quantities sufficient to produce bad results? for even the same brands of iron will vary in composition by the use of different ores, or different working of the furnace when using the same ores. One way is by chemical analysis; but this requires time and is attended by expense; the same result may be obtained by that knowledge which experience and skill (when accompanied by a peculiar talent which but few possess) enables some to acquire. All cannot do this; it would be as easy to make all persons skillful performers on musical instruments as to attempt to teach every one to sort and mix iron properly for railroad wheels. Our long experience in sorting and mixing irons (over 50 years) enables us to tell the proportions to be used to produce the desired result. It has also taught us that, as a rule, charcoal irons will chill better than anthracite or coke irons of the same grade, made from the same ores, and that iron smelted with cold blast will chill better and make a more lasting chill than that made from the same ores when smelted with hot blast, and that to produce a good wheel some cold blast iron should be used. From this you will perceive that a greater degree of knowledge, skill and care in selecting, mixing and melting iron than is ordinarily possessed by cupola tenders or foremen of foundries is necessary. In my opinion, to make good and reliable wheels the following points should be observed:

1. It is absolutely necessary to use irons possessing the proper degree of strength and chilling qualities, and to know in what proportions they should be mixed.

2. The patterns should be so proportioned as to give the greatest amount of strength for the weight of iron used, and so proportioned as to relieve the wheel from strain as much as possible, and permit a chill of sufficient and uniform depth and proper character.

3. The chill in which all wheels of a certain size are cast should be perfectly cylindrical and of a uniform diameter.

4. Care should be taken in molding that the wheels are as near like the pattern as it is possible to mold them. If the chills are properly turned and the wheels properly molded, very few will vary from a true cylinder more than $\frac{1}{64}$ in.

5. Care should be taken in pouring that no dirt or slag be allowed to flow into the mold; that the iron be of a proper temperature when poured, and that the wheel be removed from the chill and well covered with dry sand or placed in pits as soon as it will bear handling.

6. Wheels should be carefully examined to see if they are perfect, they should be tested by sledging on the tread or in some other way to see if on a strain, and by striking on the flange or rim with a pick to see if defective; they should be weighed to see if they are of the proper weight, and gauged and marked, so that two wheels of the same diameter can be put on one axle.

7. Wheels should be of sufficient weight for the service they have to perform; many wheels now in use are too light to stand with safety the increased loads and increased speed of trains—the weight of wheels not having been increased in proportion to the recent increase in the size of axle, weight of cars, etc.

All wheels should be subjected to an inspection and a physical test. The Pennsylvania inspection and test is fair and equitable, but thousands of wheels now in use would not pass this test.

It is to the interest of railroad companies to use the best wheels, for which they should be willing to pay a fair price. Some plan should be devised which will prevent any inferior and unsafe wheels from being used, and make it to the interest of wheel-makers to make the best wheel possible. Wheel-makers should also be paid a fair price and be rewarded for extra service, being paid for the number of miles over a given number, increasing the rate per mile as the number of miles increase, and charged in the same manner for all deficiencies.

Many wheels crack in the hub when first drawn on the axle or after being put into use. This is often from improper fitting: either the wheel is not bored true, or the axle is not turned round. If wheels are bored perfectly true, the hole round and of a uniform diameter, and the axle cylindrical and not tapering, it is almost impossible to burst the hub of the wheel with any reasonable pressure. We have occasionally in forcing wheels with ordinary sized hubs on an axle used a pressure of from 60 to 70 tons without bursting the hub or forcing the wheel to its proper position on the axle. Wheels should be bored and axles turned so that any two wheels will fit perfectly on any axle. To do this we find it necessary to take three cuts in boring the wheel, and always two and sometimes three cuts in turning the axle. We have never yet found lathes or mills that would do the work in a satisfactory manner with any less cuts, although ma-

chinist tool-builders claim the contrary. Uniform and reliable chilled wheels can be made if the foregoing suggestions are observed; and if the wheels are of sufficient weight, they will be as safe as the steel wheels now used in this country, and if properly chilled they will give a greater mileage in proportion to their cost.

The PRESIDENT: The specifications agreed upon by the committee require that the wheels shall be of uniform size, truly cylindrical; that they be chilled to a certain depth and shall stand certain tests, and are not designed to indicate the kind of iron, because if that is done the railroad takes the responsibility. The idea is that the wheel shall have certain physical qualities and stand certain tests, and I think that is a move in the right direction.

Mr. LOBDELL read a copy of the rules for testing wheels issued by the New York, Lake Erie & Western.

The PRESIDENT: These rules show the care with which many railroads select their wheels. The general public suppose that a railroad buys a lot of wheels of some manufacturer and puts them under its cars without special reference to their quality, strength or anything else. But railroad men understand the vital importance of having the running gear of their rolling stock of the most substantial character, especially wheels and axles. It is an open question yet whether there is any wheel safer than a good chilled iron wheel made by a responsible maker and furnished at a price at which he can afford to make a good wheel.

Mr. COUGHLIN (Boston, Revere Beach & Lynn): I have been authorized during the last week to make a test of the relative strength of cast-iron wheels, and was astonished to find how easily they are broken by a hammer blow, and how difficult it is to break them under the pressure test. I broke the flange off of a 28 in. wheel weighing 428 lbs. with three blows of the hammer, striking as rapidly as possible, so as to retain the vibration, while it took a pressure of 74 000 lbs. to effect the same result.

The PRESIDENT: The Pennsylvania drops a weight of 140 lbs. 12 or 13 ft. on a wheel. Some think it would be better to drop a lighter weight a less distance, and strike more blows, rather than to drop a weight sufficiently heavy to smash the wheel to pieces. The drop test is that it is to ascertain if there are initial strains in the wheel and to test the strength of the metal.

Mr. WEBBER: The Pennsylvania specifications as to the design, inspection and manner of testing wheels are very similar to those of the New York, Lake Erie & Western Chicago, Milwaukee & St. Paul, the Chicago, Burlington & Quincy, and other large Western roads. The essential points in all of these specifications are: First, that the wheels ball be truly cylindrical; second, that the body of the wheel shall be smooth and free from shrinkage, slag or blow holes, the tread of the wheel free from deep and irregular wrinkles, and free from sand or slag. Wheels broken must show clean gray iron, free from holes containing dirt or slag more than ¼-in. dia., or clusters of such holes, and the depth of white iron or chilled iron must not vary more than ¼ in. from the standard depth round the tread of the wheel

The drop test required to break out a piece of the iron varies from 140 lbs. dropping 12 ft. to 160 lbs. dropping 7 ft., a corresponding increase in the number of blows being required. The essential point in this drop test is that any initial or shrinkage strain which may be in the wheel when cast will be detected by the force of these blows, and it is fair to assume that if one or two wheels out of 100 cast from the same heat and at the same time stand this test, the remaining ones would also stand it.

If the wheel is not truly cylindrical, the brake pressure will be greater at one point of the circumference than at another, resulting almost certainty in the skidding or slipping of the wheel upon the rail, thereby producing a flat place upon the tread of the wheel, which is, of course, a source of great danger thereafter.

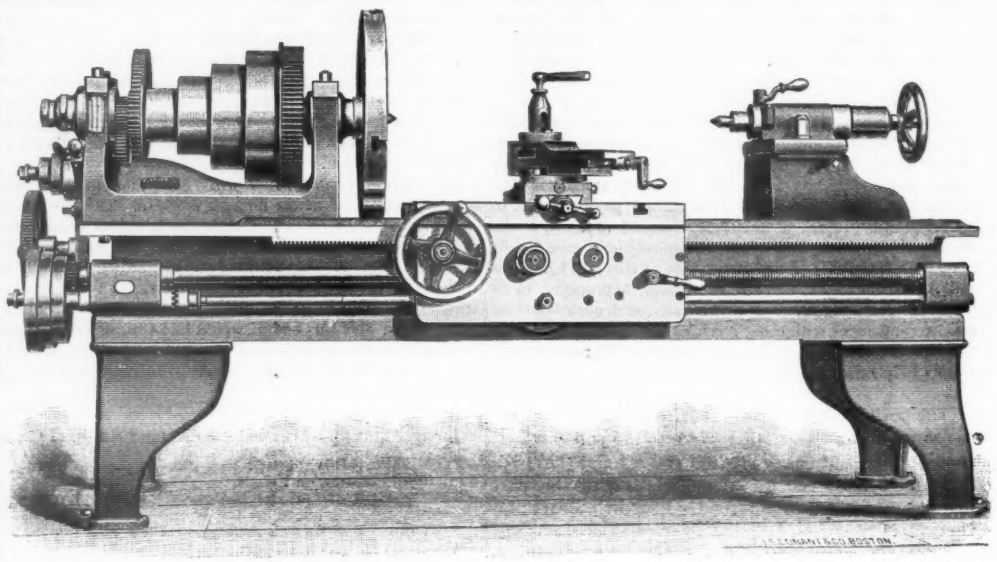
The Chicago, Burlington & Quincy claim to be almost entirely free from the breakage of wheels, and state that since the adoption of a system of car wheel inspection and testing, as above, their mileage has increased very materially. About two years ago their mileage from wheels removed from their passenger equipment was only about 25,000 miles, and as a result of the above inspection and tests, they have increased their mileage within the past year to an average of 48,000 miles. The Chicago, Milwaukee & St. Paul, in 1887, up to the first of October, claim to have obtained an average of 60,000 miles for all wheels scrapped.

Mr. ADAMS: Whether chilled or tired wheels are the best is still an open question, but it is singular that railroad companies are using a chilled wheel under their passenger equipment weighing two or three hundred pounds less than steel tired wheels are required to weigh. Steel is supposed to be stronger than iron, and this seems rather inconsistent.

The PRESIDENT: Some wheel makers have discouraged the idea that it is necessary to make a wheel weighing more than 550 lbs., they think it questionable whether it would be any stronger at 600 than at 550. I consider that wheels are too light and use under our passenger equipment a wheel weighing 650 lbs., thinking it stronger than one weighing 550 lbs. The extra metal properly distributed will make the wheel stronger, and I think, perhaps, we might with profit add 50 lbs. more and then we would have a wheel weighing only 700 lbs. against the steel wheel of 900 or 1,000 lbs.

Mr. COOLBAUGH (Boise wheel): Many steel-tired wheels weigh more than a chilled wheel because they are made largely of cast metal. Safety should be considered before economy. When a cast wheel breaks it goes like the snap of a finger. I don't claim that steel-tired wheels never break, but when they give way they go gradually, so that the weakness or tendency to fail is detected before an accident occurs.

Mr. MARDEN (Fitchburg): The conditions of the wheel in service are very different from those of any tests. The shrinkage of the iron should be carefully studied, also the form of the wheel, so as to give the best possible results under that shrinkage, and to give as few strains in the iron as possible. We have found many broken wheels at the foot of heavy grades, but after the train has been allowed to stand and the wheels to cool it is almost impossible to discover the fractures. We attribute such cracking of the wheels to the strains left in them when they are cast. When testing chilled wheels in the flange I was much surprised to find how easily they broke, though the results differed in different makes of wheels of the same thickness, some breaking with one, two or three blows, while others would stand ten or more, and so on up to fifty blows with a 10-lb. sledge. It seems to me that 550 to 600 lbs. of metal, well distributed, is enough for a cast-iron wheel. The steel-tired wheel is the safest for passenger service. A cast-iron wheel breaks when you least expect it, while the steel-tired wheel will give you some warning, and enable it to be taken out. That seems to be consistent with the nature of the metal. With the steel tire you have an opportunity to work the metal to such an extent that you are pretty positive of its being equal throughout in tenacity and strength, by rolling and re-rolling, and re-hammering if necessary. Hardly any two chilled wheels will give the same results in the test. The steel-tired wheel is also the most economical for passenger service, taking everything into consideration. A chilled wheel will be slid flat before it has run its life, while we scarce y ever get a slid steel-tired wheel. There seems to be a difference of adhesion with the same brakes in use, and the leverage has got to be different on the cars for iron and steel wheels.



SCREW-CUTTING LATHE.

Made by FLATHER & CO., *Nashua, N. H.*

Mr. CONEY (Brunswick wheel): Probably 99 per cent. of the accidents from chilled wheels are from broken flanges. It is rare that a wheel goes to pieces. Now, a steel-tired wheel very rarely breaks in the flange. A steel-tired wheel is also more safe because most patterns have some means of holding the tire in case it is broken. There have been a good many broken tires within the last six or eight months, but I have not learned that there has been an accident doing any damage occasioned by a broken steel-tired wheel. As regards economy, the vast difference in the mileage between steel-tired and cast-iron wheels settles that point; and taking into account also the greater safety of the steel-tired wheels, I don't believe that railroads can afford to run chilled wheels under their passenger cars anywhere.

Mr. ADAMS: We have used steel-tired wheels under our passenger cars and engines for 17 years, and for the last 8 to 10 years have had nothing else. They are unquestionably safer. We have never had a single accident from broken steel-tired wheels, although we have had them break. They are undoubtedly more economical. On our road we have 32 42-in. wheels that have made over 400,000 miles; 82 that have made over 300,000; and 198 that have made over 200,000.

Mr RICHARDS: When steel-tired wheels are spoken of, it is important to know whose make they are. There are some kinds which are less safe than chilled wheels.

Mr. CONEY: The important part of the steel-tired wheel to-day is the tire. In England they will not run a tire over .50 per cent. carbon; in this country they run it up to .72 per cent. If you want a wheel to run 70,000 miles with safety, it should not be over .60 per cent. carbon. In England they rarely break.

The PRESIDENT: Several years ago there was one of the most disastrous accidents the world ever saw, in England, caused by a broken steel tire.*

Mr. CROCKER (Chairman of the Massachusetts Railroad Commissioners): I am not qualified to discuss this question here with those who have been educated to it, but I came here to get information. On one Boston railroad, using paper wheels, there was last year no case of a broken wheel in passenger service, while on another road using chilled wheels, there were nine cases of broken wheels. There is either a large margin in favor of the steel tired wheel, or else a neglect in the proper means of selecting chilled iron wheels. The Pennsylvania state that only .4 per cent. of their wheels have shown any breakage. This is a strong argument in favor of chilled wheels, if they are properly selected and subjected to proper specifications and tests. On the other hand, the Allen Paper Car Wheel Co. state that of all the wheels issued by them, though there have been some breakages, there has never been a serious accident resulting in loss of life. Mr. Pullman states that, with all the wheels in his service, there has never been a serious accident, though some have broken. He finds that paper car wheels run on an average 325,000 miles. There are various ways of estimating the relative expense of steel-tired wheels and chilled iron wheels, but they differ materially in their results, and I hope that this organization will discuss this question fully.

Manufacturers of steel-tired wheels claim that there is less crystallization of the axle. The Board of Railroad Commissioners have been giving this question attention lately on account of the Bradford accident, which seems to have had its origin in a broken flange. The railroads in this state will be the first to adopt the standard wheel specifications and tests when agreed upon.

Mr. FOWLER (Fowler Steel Wheel Co., of Chicago) explained his wheel as one designed for absolute safety, and which would never break under any possible circumstances while in use; also as a wheel of perfect concentricity, absolutely round. He stated that the wheel exhibited weighed only 551 pounds, was 33 in. dia., was .36 per cent. carbon, about .37 per cent. silicon, .45 to .50 per cent. manganese, and about .30 per cent. of phosphorus. He said the flange could be battered over so it would stand out laterally without breaking. He said the wheel was finished in a dull red heat, making about 100 revolutions in the machine, and reduced at the rate of about 1-100 part of an inch to the revolution.

Mr. CURTIS (Old Colony): I must disagree with Mr Adams as to the economy of the steel-tired wheel in comparison with the cast-iron wheel. The price of the latter is about $10, half of which we get back when it is sold as old material, and it averages from 40,000 to 60,000 miles, and when we consider the price of a steel wheel, to which we must add the interest on its cost during its life, I think we shall find when we divide the cost of each by the number of miles which each will run during its life that the steel wheel is not more economical than the other. As to safety I think we are ready to adopt it.

* This erroneous statement is commented on on another page. —EDITOR RAILROAD GAZETTE.

The question of wheels was further discussed by Messrs. Marden, Curtis, Adams, Richards, Coney, Lobdell and Shinn.

The discussion will be continued at the next meeting.

Screw-Cutting Lathe.

This cut represents the new pattern 24-in. lathe, built by Flather & Co., Nashua, N. H. It has been very carefully designed to meet the demand for a strictly first-class tool, capable of doing the finest work, and stiff enough to take rapidly and accurately the heaviest cut that can be put on this size machine.

This lathe is made to gauges and its parts are interchangeable. The head stock has hard, hammered steel spindle and the bearings on spindle are ground true. They run in hard bronze boxes, which can be renewed at any time and be true with the rest of the lathe. The carriage and tool slides have unusually long bearings. The screw and rod, which are of steel, are in front of the lathe, and both run in the same casting. A short shaft, on which are mounted the feed cone and gears, is fitted in the long bearing in front of lathe. The shaft is held in position by a gear on one side and steel clutch on the other. The shaft has a hole chucked into it 3 in. deep, and forms a bearing for the feed rod, which is telescoped into and revolves freely in it. On the feed rod is a clutch to interlock with the clutch on the short shaft when in use. The screw is fitted in the upper hole of the same casting, and is connected when in use by slip gear to the gear on the short shaft, as shown in the illustration. The rod connects with feed-works in the apron by the usual friction feed, and the screw by open and shut nut, operated by a cam. The advantages of this method of connecting feed rod and screw are: it is more compact, the operator has better control of the feed, and it can be changed from belt to gear feed instantly, or from fine feed to coarse, or the reverse, quickly. In squaring up work with power cross feed, after taking a roughing cut with the belt feed, the gear feed can be thrown in, and a finishing cut, from the finest up to ⅜ in. per revolution, can be taken. The same difference can be made with longitudinal feed; also a difference 3 to 1 can be made instantly in the feed by loosening the friction feed and feeding with screw.

All actuating screws are of steel, also all small gears and studs. All nuts, wrenches and screws are case-hardened. Every lathe is run and carefully tested before leaving the works.

The lathe shown is a 24-in. swing screw cutting engine lathe. It has a 12-ft. bed and will take 8 ft. between centres. The swing over carriage is 16 in. The hole through head spindle is $2\frac{7}{16}$ in. dia. There are four changes for feed belt, giving a range of belt feeds from 24 cuts to 45 cuts per inch, and a great many changes of gear feed (through the rod and friction), from 4 cuts to 220 cuts per inch. The screw has change gears to cut from 1 to 16 threads to the inch. Speed of countershaft, 90 revolutions per minute. Friction pulleys, 16 in. diameter, 4 in. face. Weight on 12 ft. bed, 5,000 lbs. Any further particulars can be obtained of Messrs. Hill, Clarke & Co., 153 Oliver street, Boston, Mass.

The Uniform Code on the Erie.

The New York, Lake Erie & Western, in adopting the uniform code of train rules, has made a few changes which are of interest, and has filled up the blank spaces in the rules with phrases slightly different from those heretofore published. It is to be remembered that there are two chief objects which should be kept in view in preparing a code of rules for a given road: First, to stick to the principles laid down in the committee's code, unless one's conscience positively compels him to do otherwise; and, second, to see that the language is of the clearest possible character. In filling the spaces, care should be taken to follow the committee's style as closely as possible, and in adding new rules, their standard of lucidity

should at least be equaled if not surpassed. Probably no one claims the language of the committee to be absolutely beyond improvement in every case, and some of the Erie's amendments will doubtless be adjudged worthy of imitation. For the reasons here suggested, we note below the principal alterations made. Italics are used in some cases to indicate added portions, but they are not in the original, which follows the uniform code closely, as regards italics and fullfaced type.

Rule 13: Standard time is sent from Washington via New York at 12 noon, Eastern time.

Rule 36 reads: Two green flags by day, and *in addition*, etc., Rule 37 is similarly changed.

Following rule 44 is 44*a*, which reads: Three short blasts of the whistle while train is in motion is to be used by engineers to call for a "steady" in running down grade.

Rule 88 prescribes ten minutes interval instead of five.

Rule 96: When detained more than *three* minutes; ** be seen *one half mile* (or 17 telegraph pole), ** stop over *one* minute. The fireman is not to do flagging except when the brakeman is unable to go, and the rule reads accordingly.

Rule 97 reads: When a freight train is detained at any of its usual stops more than five minutes, where the rear of the train can be plainly seen from a train moving in the same direction at a distance of at least one-half mile (or 17 telegraph poles), the flagman must go back with danger signals not less than 450 ft. (or 3 telegraph poles), and as much farther as may be necessary to protect his train; but if the rear of his train cannot be plainly seen at a distance of at least one-half mile (or 17 telegraph poles), or if it stops at any point that is not its usual stopping place, he must be governed by Rule No. 99. When it is necessary to protect the front, etc. (The provision about the time of following trains is omitted)

Rule 99 reads: When a train is stopped ** *or fails to make its running time* **; ¾ mile, one torpedo: one mile, two torpedoes, and so on. Front brakemen instead of firemen, as in other rules.

Following Rule 102 is 102*a* which reads: Whenever there are two tracks in use, all trains must always (unless specially directed by the superintendent, or unless, from some cause, that track is not passable) take the right hand track; when the right hand track is obstructed, and it becomes necessary to flag trains from one cross-over to another, upon the left hand track, around such obstruction, the superintendent shall assign the duty of running trains by flag to a conductor, who shall use an engine and crew for that purpose; and it will be the duty of such conductor to see that flagmen are properly stationed, so that absolute safety may be secured, before permitting trains to cross from the right hand to the left hand track. A general order to conductors and enginemen to flag themselves on the left hand track from one cross-over to another must not be issued. This order must not be construed as prohibiting conductors from flagging themselves on the left hand track if the right hand track be obstructed; when from a break in the telegraph wires, or from other causes, they are unable to communicate with the superintendent for instructions.

Rule 110 reads: Trains must not display signals for a following train without an order from the Superintendent.

Rule 111 applies to both double and single track.

Rule 115 has the suffix "as per rule 50."

Rule 509: signatures of enginemen are required, and this rule is worded accordingly, as recommended by the committee. This rule in first paragraph, last line, reads, * * * with *his individual and* office signal.

Rule 511 requires individual signals as in 509, and says that a 19 order must not be used to move opposing trains.

Rule 514, last line, reads, * * to the superintendent *daily*.

Rule 524 is a compromise between the two forms proposed by the committee and reads as follows:

A fixed signal must be used at each train order office which shall display red at all times when there is an operator on duty, except when changed to white to allow a train to pass after getting orders, or for which there are no orders. When an operator receives the signal "31," or "19," the signal must not be changed to white until the object for which red is displayed is accomplished. While red is displayed, all trains must come to a full stop, and any train thus stopped may pass the red signal after receiving an order addressed to such train, or a clearance card on a specified form stating over the operator's signature that he has no orders for it. Operators must be prepared with other signals to use promptly if the fixed signal should fail to work properly. If a fixed signal is not displayed at a night office, trains which have not been previously notified must stop and inquire the cause, and report the facts to the superintendent from the next open telegraph office. * * *

Rule 526 reads: Regular trains will be designated in orders by their schedule numbers, as No. 10, including all the sections of No. 10, unless particular sections are designated. Sections will be designated, First Section No. 10 (meaning the first train), Second Section No. 10, Third Section No. 10, etc., adding engine numbers if desired; extra trains by engine numbers, as "Extra 798," and all other numbers by figures. The direction of the movement of extras will be added when necessary, as "East" or "West." Time will be stated in figures *and words*.

NOTE.—On divisions on which the trains of other roads are running, it will be necessary to make the name or initial of the road to which the train belongs a part of the designation of trains, as the numbers of the engines of such foreign roads may be, and in some instances are, the same as those on the N. Y., L. E. & W.

Under Form A the second example reads "No. 3 and 2d Section No. 4," etc.

Example in Form F, the word *Section* is similarly inserted.

Under Form H, example *d* reads, Work train *Extra* 292, etc.

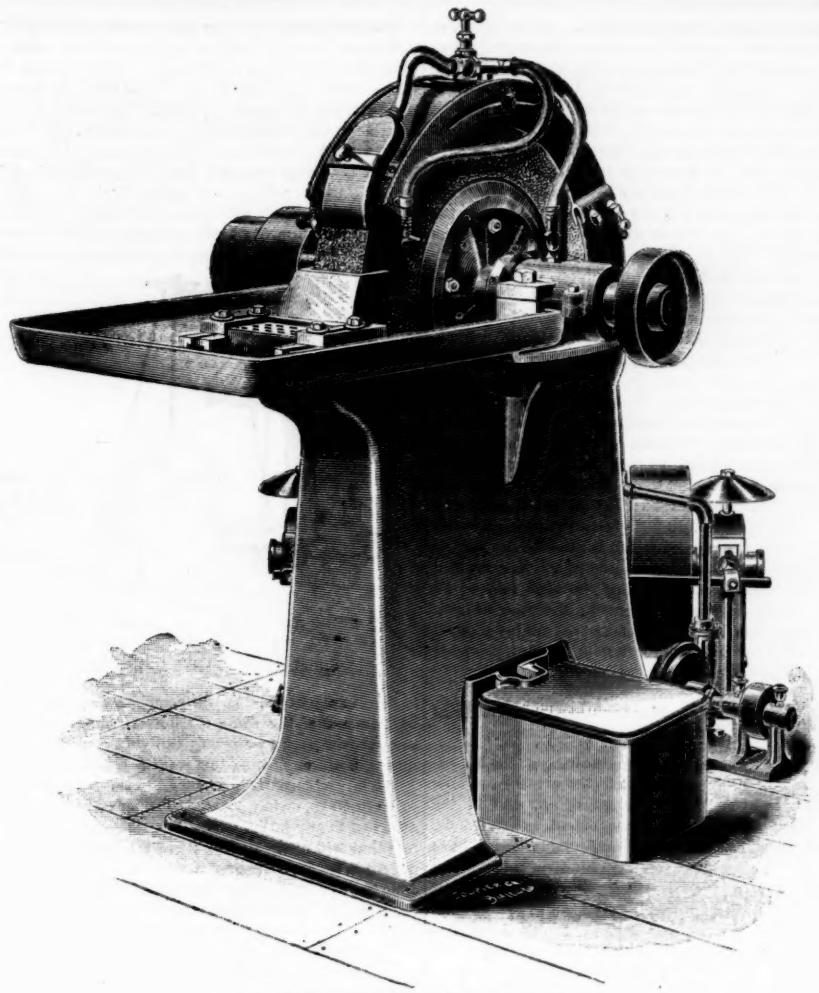
Under Form L it is prescribed that an order superseding another should terminate "*this instead of order No.* ——."

In connection with rule 514, provision has been made for the regular and careful examination of every order in the superintendent's office. Some further account of the introduction of the code on this road will be found in another column.

Improved Emery Tool Grinder.

The accompanying illustration represents a "water-proof" emery wheel specially designed for sharpening machinist's tools instead of an ordinary grindstone. It is claimed that this form of emery wheel occupies less space, makes less dirt, and does not so readily wear into ruts or groves as a grindstone, while the men can stand near the wheel and can see to do better work. The grade or coarseness of grit and degree of hardness can be regulated and adapted to the kind of work to be done.

It is claimed a machinist averages half an hour daily at a grindstone, so that in a shop with 20 men, ten hours per day are consumed sharpening tools, which at 20 cents an hour costs $600 a year. An emery wheel tool grinder will do the same work in less than half the time, at a saving of over $300 a year, or more than enough to pay for the machine the first year, even if grindstones cost nothing.



IMPROVED EMERY TOOL GRINDER.

Made by the SPRINGFIELD GLUE & EMERY WHEEL CO., *Springfield, Mass.*

The emery wheel is surrounded by a hood, except at one point, where an aperture is left for the article to be ground. The hood prevents the water flying and can be adjusted as the stone wears. The water is distributed over the entire width of the face of the wheel by means of a hollow brass chamber, which is connected to the water pipe. The construction and position of this distributing chamber is clearly shown in our illustration.

Water is also conveyed to the sides of the wheel by small rubber tubing. This arrangement is convenient for flat work and side tools.

The waste water from the wheel falls into an iron tank in the bottom of which the sediment and filings settle. The overflow from this tank is therefore comparatively clean water which runs into a second tank from which it pumped up to again supply the wheel. A centrifugal pump is used for this purpose, and the amount of water delivered to the wheel can be regulated by a valve. As the first or sediment tank has no pipe connections, it can be easily removed and cleaned, which is an important advantage.

The spindles of these machines are supplied with loose collars which are so arranged that the wheel can be properly balanced by shifting the collar to a suitable position.

Any further information can be obtained of the makers, the Springfield Glue & Emery Wheel Co., of Springfield, Mass.

Welded Steel Tubes.*

This steel is made at the Riverside Steel Works, by Mr. E. L. Wiles, M.E. For a number of years past experiments have been made with steel as a material for the manufacture of welded pipe and boiler tubes, but with varying and unsatisfactory results. The writer having made many unsuccessful attempts to substitute steel for iron, and being familiar with the failure of others in that direction, was ready to raise the stereotyped objections to the use of that metal for welded tubing whenever the subject was brought to his notice. Early in the spring of 1887, the owners of the Riverside Iron Works, of Wheeling, W. Va., decided to build and operate tube works for the purpose of utilizing, in the manufacture of iron pipe, the product of their rolling mill and forge plant, which had then lain idle for about three years, by reason of the substitution of steel for iron in the manufacture of nails. During the progress of the construction of the tube works, the general manager of the company, Mr. Frank J. Hearne, discussed with the writer the possibilities of steel as a material for pipe making, the writer using the following objections to its use:

"It won't do, for I have tried it repeatedly and failed." "It won't stand the amount of heat required to weld it." "It cannot be threaded satisfactorily, as it is very destructive to the threading tools." "It is also entirely too irregular in its character."

These objections did not seem to strike Mr. Hearne as being serious or unsurmountable. Towards the latter part of August about 30 tons of steel were made and rolled into skelp and delivered at the tube works as a trial lot, to be made into pipe. It was not necessary to brand or mark this material in any way, for the veriest tyro could distinguish it from iron, either in the strip, skelp or pipe, by its clean, smooth and fine appearance. The welders at the furnaces said at the outset that it would not do, that it would not stand fire, and by reason of their prejudices against steel they subjected it to abuse by severe overheating; yet, strange to say, every piece of that lot made a sound salable pipe, the welders remarking that "it was the best material to weld they had ever handled." It was threaded and finished with the same success as it was welded. Of course we all thought that this was a "fancy lot," or a "happy hit," the writer reporting that it was just the material for the purpose, and far ahead of iron in every particular. Soon after this several lots of one hundred tons each were made, and a record kept of the loss in the furnaces, crop ends, leakers, etc., which proved to be so very favorable to the use of steel for pipe making that the company decided to manufacture steel pipe exclusively, and to abandon the use of their forge and iron making plant altogether.

Since the first introduction of Riverside steel tubing thousands of tons have been made and sold, with great satisfaction to the users thereof, and we are advised by parties in the East that they are using our standard steel pipe for hydraulic purposes at a pressure of one thousand pounds per square inch, with success.

The steel used is made in a Bessemer converter, the chemical analysis I am unable to give correctly at present, but regarding its physical properties, can unhesitatingly say, that it is the smoothest, toughest and kindest material to work with and to weld into pipe that has ever been tried or used by the writer. * * * Please notice the butt-weld samples particularly. It is well known that very little pressure is exerted on the edges of the seam in making butt-weld pipe, hence the weld is not a very strong one usually. There is considerable loss in iron butt-weld pipe by its splitting in the weld on being tested to the regulation pressure of 300 lbs. per square inch. With steel pipes this loss is reduced to less than 1 per cent. by reason of the superior welding qualities of this steel over iron. * * * So flattering have been the reports from the users of this pipe that we can unhesitatingly pronounce it a merchantable success.

Mr. HUNT: The paper certainly shows, as well as do the

*A paper by Thos. J. Bray, read before the Engineers' Society of Western Pennsylvania, Jan. 17, 1888.

samples before us, a good record for steel. It is a fact that has been demonstrated by the Riverside people, as well as by many other of the soft steel making concerns, that a steel can be made, low in carbon, high in manganese, and low in sulphur and silicon, especially the latter, which will weld as well as iron. No, I would not say as well, but nearly as well as iron. There certainly is much steel which is made specially for this purpose which will weld a great deal better than some dry irons. However, it has not been my experience to find in large lots soft steel which would weld as well as the very best grades of iron which were made especially for welding purposes. * * * I believe in soft steel for many purposes just as much as this one of tubing, and believe it will come more largely into use. * * *

Mr. Barnes: I happened to meet Mr. Hearne this evening, and I was very decidedly of the impression, from the conversation I had with him, that more of their success was due to skill in handling the metal after they got it than to any absolute qualities in the metal itself. * * * In regard to welding, it is more a question of tact and skill and contrivance on the part of the individual workman who handles the piece at the moment than anything else, at least that is my impression. * * * Mr. Hearne told me that to cut this class of pipe was a little harder on the taps and dies used; that the metal being so extremely different it would not yield so readily as would the iron pipe, in consequence of which the machinery had to be suited to the work; the wear and tear was slightly greater, and the dies used in cutting the pipe had to be ground a little more frequently than in the case of iron. But even if this be the case, the thread is undeniably so good as compared with iron pipe that is well worth any probable difference in cost in the cutting operation itself.

Railroad Instruction at the Massachusetts Institute of Technology.

In the four years' course in civil engineering at the Massachusetts Institute of Technology, particular attention is now given to instruction in railroad engineering, and in the economics, organization and management of railroads. Railroad engineering, location and construction are introduced in the general course in the third year; but in the fourth year there is an advanced railroad course. The department of civil engineering is under Prof. George F. Swain, but Mr. C. Frank Allen has the sub-department of railroad construction, operation and management, with the title of Assistant Professor of Railroad Engineering. The aim is to give a good deal of attention to the technical side of railroad management, at the same time not neglecting the economic side. The engineering of bridges and roofs, strength of materials, mechanics, metallurgy, etc., are taught in the general course. The more special railroad instruction in the third year includes the mathematics of curves, including spirals, earth-work computation, staking out, grades, including compensation for curvature and adjustment of grades to profile, track, ballast, and pile and trestle bridges. Attention is given also to tunneling, wood preservation, culverts, ditching, and contracts and specifications.

In the current year, the third year class has spent 11 full days on a railroad survey in the field. A careful reconnoisance was made of 2½ miles, followed by a preliminary survey, with three alternate lines in some parts. The location was completed when winter set in. A contoured preliminary map was made. It is the intention to set slope stakes in the spring and to prepare the work for the contractor. The fourth year class takes up water supply for railroads, methods of handling coal, arrangements of sidings and terminals, maintainance and protection of track, construction of buildings and turn-tables, different systems of street railroads, and the economical considerations of location. Instruction is also given in signals, brakes and resistance of trains. A course of lectures is given by Mr. G. W. Blodgett on the application of electricity to railroad working.

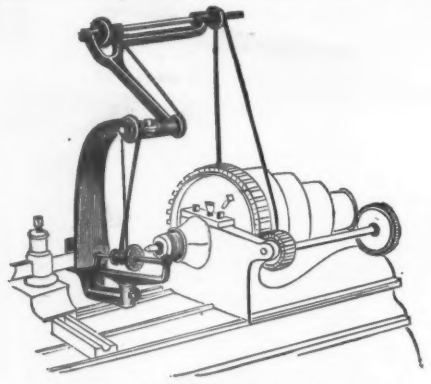
During the first term of the fourth year there is also given a course of two lectures per week on railroad management, designed to cover the broader principles of railroad administration, as distinct from the technical instruction given in the courses in railroad engineering. Considering railroad management as divided into five principal departments—financial, construction, operating, traffic and legal—the organization and functions of each are taken up in turn, with due reference to the relations of the departments to each other. A study is also made of the subjects of gross earnings and operating expenses, and of the principal elements entering into each; of present earnings and expenses in this country in comparison with those of other countries, and in former years; and of the causes tending to produce such changes and differences as are found to occur. The course includes a discussion of the important questions of the day with regard to pools, competition and combination, state ownership and control, rates and discrimination, accidents, taxation, interstate commerce and railroad legislation in general. During the last year a course of lectures on railroad economy was given by Prof. A. T. Hadley, and lectures were given by Mr. J. N. Lauder, on the locomotive; H. A. Hill, on the indicator; H. R. Towne, on shop management, and by various specialists on other topics.

Shoemaker's Universal Centre Grinder.

The accompanying illustrations represent a form of centre grinder made by J. W. Dennis & Co., Buffalo, N. Y.

The machines are made in different sizes and are claimed to be applicable to any turning lathe for grinding lathe centres, punches, pins, disks, or any hardened steel work required to be absolutely round and true.

The operation of turning lathe centres successfully and expeditiously is a very difficult matter, as every centre is better hard than soft, or partially hard. Every centre should be turned while in its place, and not be removed from the running spindle, to insure a perfect job of turning. This is impossible in the ordinary way of annealing, turning and then hardening the centre, as every mechanic is aware that the process is a long one, and that it is positively impossible to temper a centre without springing it, thus leaving it round but not true. There are frequently hard spots in a centre, thus leaving a high spot when turning it; if the centre is left soft, the result in turning taper work on it is too well known



Shoemaker's Universal Centre Grinder.

to need explanation. To do accurate work the centres must be true and of the same angle. An emery wheel has long been proven to be positively the best and far the cheapest means of accomplishing this result.

The largest size made is shown in the cut and is best suited to 16 to 46-in. swing lathes. The machines can be quickly attached to any lathe, as they are fastened to the butt of any tool that will fit the tool post; one belt answers for all sizes of lathes, as the swinging arm of the machine makes it possible to vary the distance according to the size of the cone on the lathe, as this machine is not driven from the face-plate, but from the large step of the lathe cone, making it possible to run the work in gear and keep up the speed of the emery wheel at the same time, or let the spindle stand still on fluted work.

The first driven pulley on the machine can be moved in or out on the long shaft to accommodate the length between the cone and the work to be ground; the universal head that carries the wheel can be set at any angle desired, or reversed, if necessary, to accommodate any kind of angle or odd-shaped work. It is claimed that the above are all new features in a lathe grinding attachment.

The Sibley Bridge.

The Sibley bridge, by which the Atchison, Topeka & Santa Fe crosses the Missouri at Kansas City, was crossed by the first regular train Jan. 29, although one of the 400-ft. spans was not yet complete; but it was expected to have it done by the middle of February. The total length of the bridge is 3,900 ft. There are three through steel spans of 400 ft. each and four iron deck spans varying from 175 to 250 ft. in length, with an iron viaduct over the bottoms of 1,900 ft. There are 3,600 ft. of wooden trestle bridge which it is intended to fill up eventually with an earth bank. The main river piers are 122 ft. from bed rock to bridge seat. These piers were put down by pneumatic caissons. Much difficulty was experienced in sinking some of the caissons on account of the numerous and large bowlders found in the river bed.

The act of Congress giving authority for the building of the Sibley bridge was approved July 4, 1884. The location was finally decided on in the early part of 1887. Although the act of Congress gave the alternative of either building a low bridge with a draw or a high bridge with sufficient head room for the river traffic, it was decided to build the bridge on the higher grade.

A Kansas City paper says: "It was desired to locate this bridge at the upper part of the 'Sibley Bend.' That would have given a very direct line, but it was not only found that the channel of the river was very unstable at this point, as it generally is at the upper end of a bend or lower end of a 'crossing,' but it was also found that the bed rock lay very much deeper at this point, being no less than 83 ft. below the water, while at the lower end of the bend the shelf of rock was found extending quite across the river and only 30 ft. below the water. Just above the shelf of rock there crops out on the shore a glacial moraine composed of bowlders of granite, porphyry and metamorphic sandstone. It was thought by the engineers that this glacial moraine was in some way connected with the shallow depth of the bed rock below the water, and, to test the supposition, they took borings over the bottom lands from bluff to bluff entirely across the valley, which is here some four miles wide. They found that the bed rock, which is but 30 ft. below low water under the present site of the river, was abraided to a depth of 110 and 120 ft. below the water under the present bottom lands, and they reached the conclusion that the Missouri Valley had not been excavated through the adjacent bluffs by the present forces of the river, but had been worn down by glacial action, and that the moraine already described had been deposited at the pivotal point in that glacier, where motion was so slight as to cause a deposit of the bowlders carried down on the edges of the ice, instead of dragging them forward and depositing them in the bed of the river, where they are found scattered wherever a deep bridge foundation penetrates to the bed rock. This conclusion was verified by the making of a map showing the adjacent bluffs, from which it became very evident that the old glacier changed its direction at the very site selected for the bridge."

The total cost of the bridge is said to have been $800,000, and the total weight of iron and steel in the superstructure nearly 7 million pounds. It has been built under the direction of A. A. Robinson, Chief Engineer of the Atchison, Topeka & Santa Fe, and Octave Chanute, as Consulting Engineer. The contractors for the superstructure were Sooysmith & Co. The contract was awarded to them in February, 1887, and April 8 they began the construction of the first caisson. The superstructure was made by the Edge Moor Iron Co. The erection of the superstructure began August, 1887, and 1,900 ft. of viaduct were put in place by Sept. 10. Appended is a table which has been published in the Kansas City newspapers giving time occupied in building various bridges across the Missouri. We have not verified the figures:

Location.	First work done.	First engine crossed.	No. of days.
Kansas City	Feb. 27, 1867	June 25, 1869	847
St. Charles	Aug. 1, 1868	May 29, 1871	1,032
Omaha	Feb. 3, 1869	April 15, 1872	1,102
St. Joseph	Sept. 23, 1871	May 20, 1873	605
Plattsmouth	July 14, 1879	Dec. 28, 1880	532
Boonville	Oct. 1, 1872	Mar. 15, 1874	502
Bismarck	Jan. 8, 1881	Oct. 21, 1882	620
Blair	June 12, 1882	Nov. 10, 1883	516
*Omaha	Sept. 1, 1885	Oct. 1, 1887	760
Randolph	Oct. 1, 1886	Oct. 15, 1887	379
Sibley	April 8, 1887	Jan. 25, 1888	293

* Rebuilding.

TECHNICAL.

Locomotive Building.

The Buffalo, Rochester & Pittsburgh has just received four mogul locomotives from the Baldwin Works.

The Denver, Texas & Forth Worth has ordered fifteen Mogul engines from the Rogers Works.

The Newport & Wickford road has a new Forney engine from the Taunton Locomotive Works.

The Baltimore & Ohio has begun the construction of 25 large locomotives to cost about $10,000 each, and made a contract with the Michigan Car Co. for the construction of 250 Wickes refrigerator cars.

Thirty-three engines and one snow plow were shipped from the Paterson locomotive shops during January, 14 of the former from the Rogers Works, 13 and the snow plow from the Cooke, and 6 from the Grant. The Rogers engines were mainly for the Louisville & Nashville. The Grant engines were for the Chicago, Milwaukee & St. Paul. In December the total production of the three shops was 37 engines and 6 snow plows, 24 locomotives having been shipped from the Rogers Works alone. In November the total production was 24 engines; in October it was 30.

The New York, New Haven & Hartford has ordered six soft coal burning express passenger engines of the Baldwin Locomotive Works. The engines will cost about $10,000 each and will be ready for delivery on May 1. These engines are to be of the American type, with cylinders 20 x 22; driving wheels, 68 in. diameter; weight in working order about 108,000 lbs.; weight on driving wheels about 70,000 lbs.; boiler, 60 in. diameter, wagon top, with tubes 11 ft. long, fire-box, 78¼ in. long, steel-tired engine truck wheels, balanced slide valves with Allen ports, fluted side rods, Westinghouse driver and tender brake, and with water scoop to take water from track tanks while running. These heavy engines have become necessary because the ordinary locomotives are not able to draw the heavy express trains of eight cars and more and make schedule time between New York and Springfield. The Baldwin Works are also building three extra heavy switch engines to be used at the Harlem River freight yard of the New York, New Haven & Hartford.

The Old Colony has just completed at the Boston shops one 17 × 24 standard passenger engine having bushed rods, and is now at work upon another of similar pattern. It is also building four passenger engines—18 × 24 cylinders—of the same pattern as No. 132, illustrated in the *Railroad Gazette*, Feb. 25, 1887.

Car Notes.

The Car Seat Cleaning Co., of Syracuse, N. Y., has been incorporated with a capital of $700,000, to make machines for cleaning and dusting car seats.

The United States Rolling Stock Co. held its annual meeting in New York Feb. 7. The old directors and officers were re-elected, and the capital stock was increased from $3,000,000 to $4,000,000. The proceeds of the new stock will be used in building the new works at Anniston, Ala.

The Alabama Car Works and Noble Bros.' Car-Wheel Works, of Anniston, have been taken charge of by the United States Rolling Stock Company, and large locomotive works will be built in connection with the works. A new foundry with a capacity of forty tons per day and a rolling mill with a capacity of fifty tons per day will be built.

The Cincinnati, Hamilton & Dayton has contracted for 10 new day coaches with the Ohio Falls Car Company.

The Wisconsin Central has put in use 25 new Wickes refrigerator cars.

The Buffalo, Rochester & Pittsburgh has given an order for 100 new gondola cars.

The New York, Providence & Boston has received four new passenger cars from Jackson & Sharp.

Twenty 20-ton flat cars are being built at the Auburn shops of the New York, Providence & Boston from the designs of Mr. Butler, the Master Mechanic. These cars embody several improvements. A round roof passenger car is also being constructed at the same shops.

Bridge Notes.

The Colorado Midland bridge over Maroon Creek, at Aspen, is completed. It is 600 ft. long, of iron, and is said to have cost about $50,000. The iron work was made by the Niagara Bridge Co.

It is said that the new drawbridge of the Erie main line over the Hackensack is about completed. It is to be worked by steam and supplied with interlocking latch and signals and derailing switches.

The contract for the steel bridge over the Boston & Albany at Boylston street, Boston, has been awarded to the Boston Bridge Works.

Wheeling and Ohio counties, W. Va., have voted the sum of $300,000 toward building a Union bridge across the Ohio River at Wheeling, and work on the new enterprise will begin at once. The City Engineer of Wheeling will furnish details.

The King Iron Bridge & Manufacturing Co., of Cleveland, O., has been awarded the contract for the iron work for two aqueduct bridges for the North Poudre Land & Canal Co., Larimer County, Col. They are both to be combination trusses of the Pratt type, one 80 ft. and one 60 ft. span.

An iron bridge is to be built over the Ottawa River, in

Teledo. O. Address M. J. Cooney, County Auditor, until Feb. 28.

The St. Paul, Minneapolis & Manitoba Railroad bridge at Great Falls, Mont., has been completed. It is 990 ft. long, and is the only one crossing the Missouri north of Bismarck.

Manufacturing and Business.

The American Standard Gauge and Tool Works (James A. Taylor & Co., Wilmington, Del.) have purchased the plant and business for gauge-making from the Betts Machine Co., and will continue the manufacture in the same place. Mr. Taylor was one of the original firm engaged in this business, and during its ownership by the Betts Machine Co. he had the management of this department.

William A. Harris, Providence, R. I., builder of the Harris-Corliss engine, has received orders from A. H. & C. B. Alling, Birmingham, Conn., for a 200 horse-power engine; the Rome Brick Co., Rome, Ga., for a 100 horse-power; Jones & Loughlins, Pittsburgh, Pa., for a 1,200 horse-power; Trenton Oilcloth Co., Trenton, N. J., Hackett & Atwood, Utica, N. Y., each for a 60 horse-power; Arnold Paint Works, North Adams, Mass., a 250 horse-power; Pelzer Manufacturing Co., Pelzer, S. C., a 350 horse-power; American Wire Co., Cleveland, O., a 400 horse-power; Byron Weston, Dalton, Mass., a 200 horse-power; W. F. & F. C. Sayles, Saylesville, R. I., a 50 horse-power.

The Council Bluffs, Ia., Electric Light Co. employs two engines, a Westinghouse and an Ide. It has now undertaken a series of tests to ascertain what engine requires the less coal in doing a certain amount of work. In a preliminary test the Westinghouse required 6.83 pounds of coal per hour per arc light, and the Ide 7.27. In this, the Westinghouse was supplied with a new boiler while the Ide had an inferior one.

It is reported that a syndicate has bought all the rights and inventions connected with the Van Depoele system of electricity, the price paid being $2,000,000, and is also said that the works, which are now at Chicago, will be removed to Birmingham, Conn.

The Waltham Watch Co. has put in a Baxter electric motor.

The Morden Brake Beam Co., of Chicago, Ill., has been incorporated in Illinois with a capital of $400,000, to deal in appliances relating to car brakes; incorporators, Franklin H. Watriss, George C. Wilson and others.

The Automatic Car Coupling Pin and Pulling Bar Manufacturing Co. has filed articles of incorporation in New Jersey. The capital stock is $100,000, and business will be commenced on $5,000.

Among the recent orders of the Boies Steel Car Wheel Works, Scranton, Pa., for wheels for new cars are the following: 70 new coaches for the Philadelphia & Reading building at Jackson & Sharpe's; 20 for the Delaware, Lackawanna & Western and 5 for the New York, Providence & Boston at the same works; 5 for the Providence & Worcester; 80 for the Union Elevated building at Gilbert & Co.'s, and 8 for the Delaware & Hudson Canal Co. at the same works; also orders from the New York, Lake Erie & Western, Fitchburgh and Chicago, Milwaukee & St. Paul.

The Jenkins Live Poultry Car Company has been organized in Chicago. The object of the company is to build and operate a patent car designed for shipping live poultry. The improved car has five decks, with twenty compartments in which are packed the cages of live fowls. The cars have open network sides, with storm curtains to be used when needed.

The Rail Market.

Steel Rails —Prices in the East tend rather to harden. One large lot is offered by an Eastern mill at $32.25, and the mill price may be said to be $32@$32.50, although quotations vary from $31.50@$33. Some 600,000 tons have been sold for delivery this year. Generally, the orders for spring delivery are sufficient to keep the mills well employed, and, so far as can now be foreseen, the makers expect a brisk business for the summer.

Old Rails.—The price for old rails is about $22 for T, and $23 for double headers at tide water.

Rail Fastenings.—Splice bars are quoted at about 2c. per lb.; bolts and nuts, 3.1c., and spikes, 2.15c.

The Burton Stock Car Co.

The Treasurer of the Burton Stock Car Co. has issued a report to the stockholders in which he states that the city of Wichita, Kan., gave to the company the land for its shops and subscribed for $200,000 of the company's stock at par. It is expected to begin to turn out cars the middle of March. The works will have a capacity of 16 freight cars per day. The company has made contracts with the following railroads: Chicago, Rock Island & Pacific, including the Keokuk & Council Bluffs; Burlington, Cedar Rapids & Northern; Wisconsin, Minnesota & Pacific; Minneapolis & St. Louis; St. Joseph & Iowa; and the Chicago, Kansas & Nebraska Railroad companies. These contracts went into effect on Jan. 15, 1888, and are to remain in force for a period of years from that date. In addition to those above mentioned, other contracts equally large are about to be closed. It will require about 8,000 Burton stock cars to meet the demands of these roads.

The stockholders of the Company held their annual meeting at Portland, Me., last week. It was voted to increase the capital stock to $2,000,000. The following directors were chosen for the ensuing year: Charles F. Adams, of Boston; P. C. Cheney, of Manchester, N. H.; Edward Spalding, of Nashua, N. H.; George D. Burton, of New Ipswich, N. H.; Josiah T. Wilson, of Boston; J. O. Davidson, of Wichita, Kan.; Virgil C. Gilman, of Nashua, N. H.; J. W. Fellows, of Manchester, N. H.; H. G. Lee, of Wichita, Kan., and others. Hon. Joseph C. Moore is President.

German Technical Terms.

A writer in the *Glaser's Annalen* (German) argues with unintentional comicality in favor of getting rid of foreign and ambiguous technical expressions. He finds "machine" a very improper expression for "locomotive," and gives the following list of improper expressions which he finds in the technical literature of the day: "Mixed machine" instead of "locomotive for mixed trains;" "passenger machine" instead of "passengertrainlocomotive;" "fast-tender-locomotive" instead of "express-train tender-locomotive; "locomotive with sixfold coupled axles" instead of "locomotive with six coupled wheels;" "eight coupled machine" instead of "locomotive with eight coupled wheels;" "three axled coupled freight machine" instead of "freighttrainlocomotive with three coupled axles."

The German language would certainly be a dead one if this gentleman had his way, for, as Mark Twain says, none but the dead would have time to use it, particularly as he makes a vigorous protest against the use of the Roman text, —in which, by the way, his article is printed— instead of the good old-fashioned eye-wearing German. He makes a good point, however, against his fellow mechanicians for having 11 different words for connecting rod, two of which, Bleuelstange and Pleuelstange, are due to the German inability to tell the difference between the sounds of b and p.

A Railroad in Abyssinia.

The Italians are laying a military railroad from Massowah a short distance into the country. No advices have been received of the length to which it is proposed to carry this line or of its character.

Standard Brake Head and Shoe Patterns.

Arrangements have been made by the Executive Committee of the Master Car-Builders' Association] with the Ramapo Wheel & Foundry Co. to supply patterns of the standard Christie brake head and shoe to members of the Association. The patterns are made of brass, and are carefully finished, ready for molding, with core boxes and lifters complete. They are intended to be used in the foundry for making castings for service, and allowance has been made for only one shrinkage.

The prices for patterns will be as follows:

	Pattern for brake head.	Pattern for brake shoe.	Patterns for brake head and shoe.
For 33-in. wheels	$12.50	$7 00	$19 50
For 42-in. wheels	12.50	8.00	20.50

These prices, include boxing f. o. b., at Ramapo. Orders should be addressed to the above-named company at Ramapo, Rockland County, N. Y.

Steel Scrap.

It is only in recent years that there has been any serious question raised as to the disposal of steel scrap. When the use of steel was quite limited, the separation of steel from iron scrap was rendered an easy matter by the form of the piece or by its superior finish as compared with similar articles made of iron. The introduction of cheap processes for the manufacture of steel and the rapid substitution of steel for iron have changed all this, and the discrimination between steel and iron has become a test of expert knowledge, with a very fair chance of the frequent embarrassment of the most skillful and experienced.

This is a serious matter in forging iron car axles, heavy cranks, locomotive frames and all work in which scrap iron is fagged or welded into huge masses or special shapes under the hammer. If a piece of steel should be accidentally included an imperfect weld would result, with possibly great loss or damage as the consequence.

When cheap steel first began to be substituted for iron the fear was expressed among consumers that as the articles made from it were worn out there would be no use found for the scrap. It could not be reworked as easily and simply as old iron, and if it possessed no value as scrap its advantages over iron in point of increased service and greater strength were counterbalanced by this economic defect. The introduction of steel rails was seriously opposed on this ground by many railroad officials, who were supported in their views by the manufacturers of iron rails. It was argued that old steel rails would be entirely worthless when they were worn out, and even though they might last two or three times as long as an iron rail, the money invested in them was absolutely sunk; whereas, in the case of iron rails, a considerable proportion of their cost was always certain to be realized whenever they were pronounced unfit for further service in the track. But this objection to steel rails proved futile to stay the steps of progress in this direction, and the question as to what would become of the old steel rails was left to the solution of time And time is solving the problem without special difficulty. Old steel rails are now coming on the market in appreciable quantities, increasing from year to year, but finding a demand for certain uses which seems to grow in proportion to the supply. It is true that the price realized for old steel rails is not so high as for old iron rails, but this is not a serious matter to the railroad companies selling them when the advantages attending the use of steel rails are taken into consideration.

The same objections are now being urged to the use of soft steel as a substitute for iron in other directions. Railroad companies having their own construction and repair shops hesitate to introduce soft steel for sundry purposes in which it has obvious advantages over iron lest their scrap should be hopelessly intermingled, to the detriment of the forgings which they turn out. In this case there is more force in the objection than with regard to steel rails. It is much more difficult to determine which of two unmarked bars or rods is steel and which iron than of two rails, both of which probably bear the maker's name and the year in which they were rolled, and perhaps other means of identification. But this objection is not a fatal one to the use of steel for such purposes. It has been proposed that wherever possible the finishing rolls for steel shapes should have the word "steel" cut in them, so that it would appear in the rolled product at least once in every foot. This would make the detection of steel an easy matter in assorting scrap, and if steel manufacturers would adopt this system of working their product an important step would be taken toward its approval for uses from which it is now debarred. Of course all forms of steel could not be thus marked, but a very considerable proportion could be, especially those which are liable to be thrown in a railroad scrap heap.

As the use of steel increases in the direction specially referred to there will be an increasing quantity of it thrown on the market, because much of it will require special appliances for reworking it. This will be another problem to be solved in the future. Possibly the increasing number of open-hearth steel furnaces may afford an outlet for such material, which is necessarily of good quality. Rolling mills making small steel specialties may also find it economical to purchase selected steel scrap suitable for their requirements, which can be rolled down after a simple heating. It is also possible that our untiring experimenters will yet find a process by which steel scrap can be welded as satisfactorily as iron. Whatever the outcome may be, however, the prediction seems perfectly safe, despite the present light demand, that steel scrap will be utilized in our industrial economy as rapidly as it becomes more and more a part of our regular supply of old ia.aterm—*Iron Age.*

Heavy Snow Plow.

The Chicago & Northwestern has just finished a large snow plow to be used in Dakota. It weighs 90,000 lbs. and is intended to be used with six locomotives coupled together.

McCoy's Rail Scraper.

A rail scraper for removing sand from the rails after it has served its purpose in increasing the traction of the engine, was tested last week on the Cincinnati, Wabash & Michigan, at Wabash, Ind. The device is the invention of Mr. Curtis McCoy, and is placed back of the rear drivers of the locomotive and is operated by a lever in the cab. The brooms are of steel wire, and when the rail is being sanded in ascending a grade the engineer drops the brooms upon the rails in order to remove the crushed sand. When no sand is escaping the brooms are raised. It is claimed that with one of these sweeps attached an engine can pull from one to two more cars up an incline than is possible without it. An engine stalled, which stalled with 18 cars when the sweep was not in operation, ascended the same grade with 20 with the sweep applied.

New Staten Island Ferry-boats.

The steel steam ferry-boat, Robert Garrett, built for the Staten Island Rapid Transit Co., was launched recently at the Columbia Iron Works and Dry Dock, in Baltimore. She is built of ¼-in. steel plates, and is 250 ft. long over all, and 64 ft. beam over guards, and will have a draft of 7 ft. 10 in. She will have inclined compound engines of 1,500 horse-power, and will make 15 miles per hour. The E. Wiman, another steamer for the same company, will be launched about six weeks hence.

While these boats will doubtless be faster and more commodious than those now running between New York and Staten Island, their power and speed falls far short of modern practice. In these days of paddle steamers of from 5,000 to 7,500 I. H. P. running at from 19 to 23 knots, or 22 to 26½ miles an hour, a speed of 13 knots seems slow.

A Bridge on Ropes.

The Oregon Railway & Navigation Co. lately improvised a novel bridge at Willow Creek, where ten bents of a trestle were washed out. The wagon bridge immediately above was washed away, and this, with the ice gorge, caused the railroad structure to give away. It happened, however, that the ties, rails and stringers held together, sagging nearly to the water. Two 6 in. hawsers were secured at Umatilla, and one end made fast below the break. The hawsers were hauled taut by block and tackle, and the track suspended to them in the centre. In transferring, the baggage and mails were put into a push car and shot across the suspension bridge, men on the other side catching the car. Passengers walked across the bridge.

Car Heating Notes.

The Old Colony road have now six cars of the Fall River boat train equipped with the Sewall system. It has been in use something over two months, and during the recent cold weather an average temperature of 70 degrees was maintained in the cars between Boston and Fall River, a distance of 50 miles.

Prof. Gaetano Lanza, of the Massachusetts Institute of Technology, is making an investigation of the various systems of steam heating in use on the roads running into Boston for the Massachusetts Railroad Commissioners.

The Chicago, Burlington & Quincy are about to try the Sewall system of continuous heating on a train of twelve cars.

New Locomotives and Cars.

The Newport & Wickford Railroad & Steamboat Co. will shortly receive from the Taunton Locomotive Manufacturing Co. a Forney engine to work the line between Wickford and the junction with the main line of the New York, Providence & Boston. The engine, which will be named Newport, will be carried on four coupled 56 in. driving wheels and a four-wheeled truck under the tank. The rigid wheel base is 6 ft. 6 in.., and the total wheel base 22 ft. 9 in. The weight in working order is about 80,000 lbs., of which 50,000 lbs. is on the drivers. The cylinders are 14 in. diameter by 20 in. stroke, and the steam chest is equipped with balance valves. The wheel centres are turned 50 in. in diameter, and the Midvale steel tires are 3 in. thick and 5½ in. wide. The axles are of best hammered iron with journals 7 in. in diameter and 8 in. long. The four truck wheels are double plate, 28 in. diameter, axles of M. C. B. standard, journals 3¾ in. diameter, 7 in. long. The boiler is straight telescopic, of Otis steel with all horizontal and juncture of waist seams double riveted or welted. The diameter is 46 in. at smoke arch. The steam dome is 26½ in. diameter and 26 in. high. The Otis steel fire-box is 60 in. long inside and 34½ in. wide, with water tube grates. The flues are of iron, 126 in number, 2 in. diameter, and 10 ft. 6 in. long, with copper ferrules at both ends. The engine has the extension smoke arch and fixtures, the straight stack with open top, two pilots, two sand-boxes, and two 23-in. headlights. The boiler is lagged with asbestos plaster and jacketed with Russian iron. Feed water is supplied by two Mack's improved No. 6 injectors from the tank of 1,200 gallons capacity. The engine will have the Westinghouse automatic air brake for tender and train, piped for front and back connections, and also the steam driver brake, and be equipped for steam heating by the Gold system.

Six new cars have been recently built by the Jackson & Sharp Co., of Wilmington, Del., and are mounted on two four-wheeled trucks of the New York, Providence & Boston Railroad standard pattern. The cars seat sixty-four passengers each, and have large double windows, with rubber weather strips and a double blind in a very light wood. The seats are mahogany frame, of an extra width, 18 in., and the backs, which are locked in position, are provided with springs. The wide window ledges now growing popular are here introduced and form a very convenient resting place for the elbow of the traveler next the window. The interior wood finish is in a rich red with fluted columns between the windows. The roof is in quartered oak with fresco decorations, giving a light and pleasant effect. The retiring room is lighted by a glass panel at the top, and carries on its exterior, facing the passengers, a large mirror of beveled glass. The ventilators in the monitor deck are pivoted horizontally, and additional ventilators over the doors are arranged to draw through screens air from the under side of the hood over the platform at times when it is not practicable to have the side ventilators open. The luggage racks are of polished brass, and are very neat in design.

Some of these cars which will be run by the New York, Providence & Boston are lighted by five Pintsch gas clusters, with two mineral oil fixtures on the sides for use in emergencies, and are equipped with the Baker heater. Double cylinders provide for the storage of twice the quantity of compressed gas usually carried under a car, and the Baker circulating pipes will be utilized by the Wilder system of heating by steam from the engine, which this company uses on some of its trains. The Wickford line cars are lighted by mineral oil lamps, and will be piped for heating by the Edward E. Gold system. The tools are placed in a box recessed into the retiring room. A glass front can be fractured to get at the tools in case of accident, and even if the car door were held open, the axe, sledge and saw could still be got at by breaking two thicknesses of glass only. The combination and baggage cars are equally complete in their appointments. All the cars are carried on 36-inch steel-tired wheels. They have to be fitted with a new brake shoe, which grips the flange as well as the tread of the wheel, and after the steam connections have been fitted the cars will be placed upon the 3:40 P.M. express to New London.

Boston & Albany Locomotives.

Mr. A. B. Underhill, Superintendent of Motive Power of the Boston & Albany, is having printed a pamphlet giving many interesting details of the construction, age and performance, etc., of the 250 locomotives owned by that corporation.

RAILROAD GAZETTE

Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections appointments, and especially annual reports, some notic of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

It is understood that the proprietors of the Janney patents have made what is termed a waiver of the patent relating to the contour lines or form of the Janney coupler. This waiver permits any railroad in the Master Car-Builders' Association to make or use couplers which will couple with the Janney free of charge for royalty, provided that previous application be made to the proprietors of the Janney patents. This is a graceful act, and enables the committee of the Master Car-Builders' Association to choose the lines on mechanical grounds alone, unhampered by questions of royalty or favoritism. When these lines are once agreed on railroads will, it is to be hoped, be able to at once equip their cars with vertical plane couplers without awaiting the result of patent litigation. It seems probable that the lines officially adopted by the Master Car-Builders' Association will be a very close approximation to the Janney lines, but nothing definite can be stated on this point at present.

The Railroad Committee of the House of Representatives of the state of Iowa has reported a bill providing for most stringent regulation of rates. On first-class roads a schedule is imposed, limiting the charge for 100 miles to 32 cents per hundred on first-class goods, 11½ cents per hundred, fourth-class, 10 cents per hundred, fifth-class, and making them as low as $6\frac{3}{10}$ cents per hundred on the lowest car-load class. For 500 miles the corresponding rates for the several classes are 71 cents, 36 cents, 30 cents and 16 cents per hundred respectively. Second-class roads are allowed to add 10 per cent. to these figures, and third-class roads 20 per cent. There is some talk of reducing passenger rates to 2 cents per mile.

We do not see how it is possible that such restrictions, if enacted, should remain long in force. If such a measure interferes too much with railroad profits it will react against those who hoped to benefit from it. Whatever may have been the improvements in railroad economy this general principle remains as true to-day as it was in 1874. If the Iowa roads have no large surplus profits from their business within the state, their very weakness acts as a protection against legislation of this kind. And there is not much to warrant the assumption of extraordinary profits on Iowa business just at present. The general drift of the evidence is in the other direction. The Illinois Central has found its Iowa lines increasingly unprofitable, and has finally got rid of one of them in disgust. There are probably many other Iowa roads not much better off than these. The Iowa commissioners' report states that five lines report operating expenses in excess of earnings. The amount available for the stockholders of all the roads in the state averaged only 2.22 per cent. on the capital stock. This is not a margin which admits of very radical legislation.

Even as matters now stand, we hear complaints of a car famine in Iowa. We do not know how far this is to be attributed to the low rates which prevail at present; but we do know that if these rates are forcibly lowered, it will tend to aggravate the car famine. This is one of the quickest ways in which a reaction against excessive regulation makes itself felt. No means can be devised by which a man who is not able or willing to pay for services rendered can get as many facilities as one who is willing and able to pay for them. There will be more inducement to have plenty of cars when rates are high than when they are low. No law can prevent this. The law can, for the time being, compel a road to furnish the use of its track and stations at inadequate rates, because the track and stations are there, and cannot get away. But the cars can get away with remarkable ease, and they usually do it on very slight provocation.

Within the last ten days there have been three important utterances published with regard to Pacific railroad affairs. The first is that of the Government Directors of the Union Pacific Railway. This report indorses the position taken by the majority of the Pacific Railroad Commission. On one point they are even more explicit. They urge with great force the advantage of any plan of adjustment which shall put the Government in the position of an ordinary private creditor, with the same security which one business man has in dealing with another. They doubtless see the evils of the present system of partial control, where the Government has almost no power to restrain a bad man, but a very serious chance to hamper a good one.

The second important utterance is that of Mr. Huntington, of the Central Pacific. He proposes a readjustment and settlement of the debt on a basis of 250 semi-annual payments. We have not yet seen the details of his plan, but it is said that he allows the Government interest at 2 per cent. When a debt is going to run on into the twenty-first century, the difference between 2 and 3 per cent. becomes quite considerable. We think it would be better not to pretend that any such plan is a payment in full. If it is accepted, it should be accepted as a compromise by which the Government gives up more extensive rights, imperfectly secured, for narrower ones with better security. We think that this is a wise policy; but let us openly and truthfully give up part of the principal and then calculate the interest on the remainder at a proper rate, rather than pretend to be getting what we really are not. We know so little about the twenty-first century any way, that it is hardly worth while to pretend that a debt is going to be paid then, when it really will not be.

The third utterance is that of Mr. Adams. He is quoted as favoring a measure on the general line of the Outhwaite or Commission bill, with modifications. We shall look with interest to see what his proposed modifications are. We should particularly like to know whether he expects his company to be able to make larger annual payments a few years hence than it can now, and is willing to incur the obligation to make such payments. This is the real point at issue with reference to the Commission bill. Mr. Adams, whole position depends upon the question what sort of a detailed modification he proposes to make at this point.

A proposition is made to create a statistical department in the New York Stock Exchange. It is proposed that this department shall examine and pass upon the reports of railroad companies, for the benefit of brokers and investors. The idea at the bottom of this suggestion is that the directors' reports as they are made to the stockholders are sometimes designed to mislead, and when that is not the purpose of them the full significance of the figures given can only be extracted by an expert. Therefore it is proposed to have an unprejudiced and competent study of the reports made and published in the interest of the Stock Exchange and the public. In a communication addressed to the members of the Exchange advocating this measure, some of the good results to follow it are said to be that—

"(1) We could understandingly commend securities to investors, feeling that as thorough an examination as was possible had been made by our own servant.

"(2) The knowledge that a railroad was solvent and on a sound basis would give confidence to buyers, particularly in times of panic, and so limit the shrinkage in its securities and the operators' loss."

A petition in favor of such an auditing department has been signed by many of the most important Wall street houses. It is suggested in the communication quoted above that the indisposition of the public to operate in stocks comes from doubt as to the truth of directors' reports. Instances of such absolutely untrue reports are rare, and have usually become notable scandals, but questionable allotments of expenditure accounts and deficient moral courage in appraising assets are common enough, and are fruitful subjects for expert investigation. For instance, the new construction, betterments and rolling stock accounts of many roads contain errors of judgment more or less biased by the longness or shortness of the executive stock holdings—errors which unprejudiced study and a physical examination would reveal. Stocks and bonds of branch and connecting roads, whose value is mainly protective in preventing the division of business, are occasionally carried as an asset at too large prices, and examination and early publicity would in such cases prevent the shock which the market receives when it is suddenly developed that a road with an enormous hypothetical surplus cannot pay its bills and can borrow only on onerous terms. Each great operator on the street maintains his own statistical department, and the partial exclusiveness of his information is part of his stock in trade. It is as a defense against operators and their malevolent combinations as well as to lighten the evil effects of panics that true analyses of reports may be most effective.

In our issue of Feb. 3 was a letter from a correspondent, "J. F. H," on the demurrage question. "J. F. H." wrote from the standpoint of the shipper, and amongst other complaints which he makes against the railroads is this: That, while railroad companies can collect demurrage on their cars, shippers cannot collect demurrage [loss from delay] on their freight; and he states that the manner of collecting demurrage charges is as follows: "If a consignee refuses to pay a demurrage charge he is informed that the next shipment that arrives for him (1) will be sent to a public store, or (2) unloaded at his expense at some inconvenient place, or (3) the transportation of further shipments for him will be refused until the charges in question are paid." A freight agent of an important road writes that "if it is a fact that a railroad company can hold or place in store at owner's risk and expense, a consignment of freight, on account of refusal of consignee to pay demurrage charges on a previous shipment, I have certainly gained valuable information. I have always been instructed and supposed it to be well understood that a railroad company could not hold a shipment of freight, even in order to collect transportation charges on a previous shipment for the same consignee which had been delivered without such collection, or where insufficient charges had been collected, much less would I expect to be sustained in an attempt to withhold delivery for the purpose of collecting demurrage on previous shipments." He further asks if there is any good reason for supposing that any railroad would pursue such a course as J. F. H. specifies, and in what part of the country such practices prevail. The law provides that a carrier has a lien upon goods carried, to secure compensation for carriage and for advances made to further transportation. This lien "is nothing more than the right to retain possession of them until such charges have been paid or tendered." This, however, is only a specific lien, confined to charges upon the particular goods on which it is claimed, and does not give the carrier the right to hold the goods to secure any balance on other accounts. The lien covers transportation charges only, and does not extend to demurrage. Moreover, this lien ceases when the goods are unconditionally delivered. It is inseparably associated with and dependent upon the possession of the goods. Of course all this may be modified by contract or agreement between the parties, and the law further provides that carriers may, by the *long-established* or *well-known usage* of *particular localities*, become entitled to retain goods for general balances. It is evident that if a consignment is held for demurrage charges on a previous consignment it is held illegally, or else it is held according to the terms of a special agreement, or well-known usage. We do not learn that such is the usage of any company, in any locality. It may be done in special cases, by some of the small roads, or by agents at non-competing points, acting, perhaps, without instructions. But we should doubt if it is a common practice on any road, in any part of the country. Ordinarily, the legal complications following such summary proceedings will not be the only consideration. Fortunately, it happens that usually a railroad is rather anxious than otherwise to retain the business of any one shipper, and probably it will be found, on careful investigation, that demurrage charges are oftener remitted than forcibly collected.

There are various conditions under which a carrier may decline to accept goods for transportation, but unquestionably an unpaid claim for demurrage on a former shipment would not be held to be such a condition.

The letter of J. F. H., presents views of other phases of the demurrage question which railroad men cannot accept as unbiased. He gives a clear summary of the arguments on the side of the question which railroad men sometimes forget, and his letter is therefore well worth reading. He discerns a point or two in railroad methods which men of his class do not generally discover, but of course it cannot be admitted that consignees have such storage facilities that they have no motive in being slow, nor that small consignees are better to get along with than large ones. The inconsistently high rates generally prescribed for demurrage, and the crude methods adopted in dealing with the problem, are, however, proper targets for a shipper's wit, as traffic men will admit. Undoubtedly a rigid enforcement of high demurrage charges would soon bring on a movement to have time guaranteed on freight shipments. Conservative railroad officers assert that a practical system of demurrage will yet be devised, and there are indications that the reform will not be much longer delayed. Whenever managers can agree to confine themselves to other means of favoring customers the way will be open for a step forward. The difficulties presented by rainy weather, strikes, unavoidable gluts, etc., will probably have to be met by compromise. Freight agents and grain dealers could never agree as to whether a certain degree of wet or mud justified the hauling off of a team or whether a high gale did or did not warrant a refusal to unload mill-stuffs or bran. Retail coal dealers who desire to deliver as much coal as possible direct to consumers in the busy season, will always find it hard to take an unprejudiced view of the weather and the sledding when urging the railroad agent to leniency. A good way to eliminate all these uncertain factors would be to fix a very low rate to begin with; a rate which could be enforced during storms, holidays and even Sundays, and still do no injustice in the long run. A trial of this with a proper and full explanation ought to prove acceptable to fair-minded consignees. But in saying "very low" we would not forget the cost of yard room and of repeated handling which enters into the expense of holding a dozen or a hundred cars an excessive length of time. In the long run this item is worthy of attention. A diminution in the average number of bulk cars held in a yard may postpone considerable expenditures several years; and where the switching engine goes into a yard to take out empty cars once a day, ten cars standing ten days frequently have to be hauled out and backed in again every day, making the equivalent of 100 car movements, of which from 50 to 80 per cent. is to be classed as waste.

The Proper Length of Dead-blocks.

Two representatives of vertical plane couplers argue in letters in this and the preceding issue of the *Railroad Gazette* that 9 in. dead-blocks are not wanted for the protection of their particular couplers. Two lines of argument are taken. Mr. Timms states that some vertical plane couplers are so strong that they do not require the protection of dead-blocks. This assertion will be greeted with an incredulous smile by those who have had some practical experience on the subject, and it is pretty generally acknowledged that even if the coupler can stand, some precaution should be taken to prevent the cars coming together when the draw-spring breaks or the draw timbers give way.

The other argument is that the couplers can be placed beneath the sill and need not be constructed to buff against it.

The fallacy in this line of argument is obvious. The strains in buffing with our modern long trains of heavy cars and immense locomotives are very severe, and can only be met by making the line of resistance pass directly through the strongest part of the car. It is obviously of little utility to use a strong draw-bar and let it bear on a weak foundation. The draw timbers are at the best held only by bolts, and it is folly to neglect the end sill, which gives a firm bearing against the longitudinal sills and does not depend on bolts.

On examining the ordinary non-automatic draw-bars that when driven home butt against the sill, it will be found that they all require dead-blocks which project more than 6 in. beyond the sill, the size deemed to be sufficient by our correspondents. The accompanying diagrams show the couplers on two cars recently illustrated in these columns. Fig. 1 shows a refrigerator car. The draw-bar projects 10½ in. beyond the sill when home and therefore requires dead-blocks projecting about 10¾ in. The Michigan Central latest freight car is equipped with the Ames draw-bar and this, as shown in fig. 2, stands 12 in. beyond the sill when driven home. Fig. 3 shows that this distance is chiefly mede up by a wooden bed or packing piece on which the cast-iron dead-block rests. This is practically equivalent to a 12-in dead-block. The usual pattern of the Potter draw-bar projects 7 in. Several of the cast-iron draw-heads in common use require dead-blocks projecting 8 in. from the sills. Among

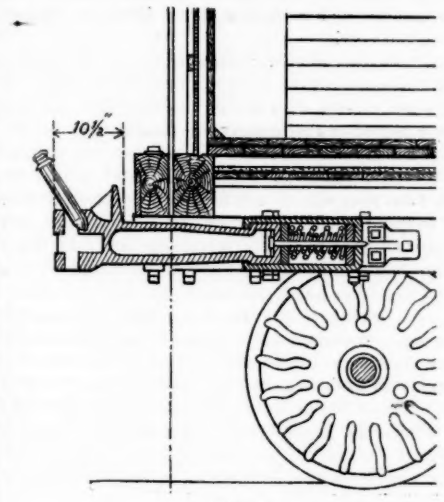


Fig. 1.

these may be mentioned those of the Great Western Dispatch; Missouri, Kansas & Texas; New York & New England; United States Rolling Stock Co., etc. The Gifford draw-bar, of which there are some thousands, projects about 7¼ in.

It is difficult to see what valid objection there can be to using a few pounds of cast iron to secure a dead-block which will keep the cars a safe distance apart

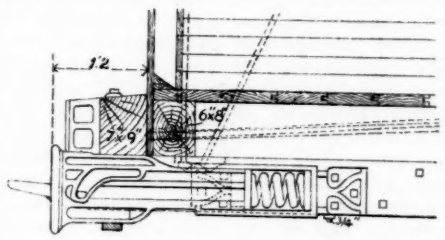


Fig. 2.

when the draw-heads are unable to stand the shock. It is not, therefore, surprising that the objections come from inventors and not from car builders, who know from practical experience the heavy nature of the blows to which couplers are subjected in actual service.

A more important consideration affecting the

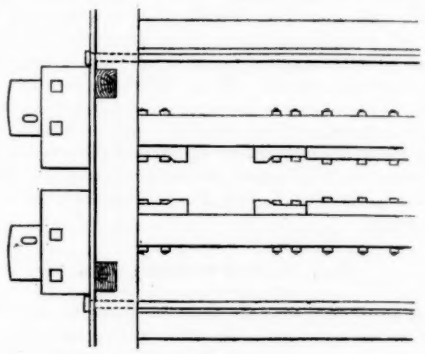


Fig. 3.

proper length of dead-block has not been alluded to by our correspondents, but should not be lost sight of, as it involves other improvements in the running of freight trains and it is obvious that the adoption of standards should always be made with a view to future improvements as well as to past experience.

In considering the question of the length of dead-blocks it must be borne in mind that if continuous brakes are to be largely used on freight trains in the near future, men must go between the cars to couple up the hose. It is therefore evident that the cars must be kept a certain distance apart to enable the men to effect this coupling in safety. Unless this is done, the saving of life and limb gained by the use of automatic couplers will be in a measure offset by cases of injury caused in coupling hose. The conditions of freight train working render it certain that the brake hose will often be coupled when the cars are moving slowly or are being driven as closely together as possible by the impact of a dozen additional cars kicked on at the front end by a powerful engine. It is therefore essential that under the most adverse circumstances the cars should be kept such a distance apart that a brakeman can safely go between them. This distance cannot be much less than 18 in., and that is just the distance permitted by the use of two 9 in. dead-blocks.

Cars fitted with 6-in. dead-blocks can, even on a straight track, approach within 12 in., and this distance cannot be regarded as sufficient to prevent a man being seriously hurt if caught between the cars.

The Uniform Code on the Erie.

The uniform code of train rules is soon to go into effect on the New York, Lake Erie & Western.*

The managers of this road have made elaborate preparations for making this change with safety and in a way to secure all the advantages of the improved code. Some account of their doings will therefore be of interest to operating officers. Notwithstanding the exhaustive labors of the framers of the code, there is still an important and delicate task for any superintendent who adopts it. He must carefully consider the habits of his men and the ways they have hitherto taken to comply with the rules in force. For, it must be acknowledged, many a man keeps his place and performs his duties in such a way as never to be suspended or even censured, while all the time his means and methods are far from logical and quite likely worked out and adopted independently of the letter of the rule. The spirit of the new code should be adopted as well as its letter; and therefore a clear explanation of the differences and improvements that are involved should be given. This is no easy task, especially on a large system of lines, covering a wide territory in which the things that men have learned from neighboring roads or through tradition vary a good deal.

The Erie system, including the New York, Pennsylvania & Ohio and numerous other leased lines comprises ten divisions; each of these includes from 150 to 300 miles, and in most cases consists of several subdivisions and branches. There are over 100 places at which one or more train crews have their headquarters and 76 where standard clocks have to be placed.

Every one who has examined the uniform code will agree that the elaborate regulations concerning the quality of trainmen's watches, and their inspection and care, are none too minute and exacting, when considered in connection with the rules governing trains at meeting points. Where opposing trains, each of which may contain hundreds of passengers, are to meet under circumstances where the mistake of a minute may involve considerable risk of collision, nothing but the best grade of timepieces and the best supervision of them is tolerable. The Erie officers recognize this and have taken wise action in the matter. A committee of them went to Washington and made a thorough study of the time systems of the government observatory, getting the results of the study and experience of the accomplished officers there. While the system of telegraphing time from Washington furnishes an admirable means of setting all clocks right once a day and of securing a good degree of accuracy even with an ordinary grade of clocks, the Erie resolved to "get the best" and so at once provided new Howard clocks for all the 76 designated points. These clocks are warranted to vary less than 30 seconds a month (the requirement for trainmen's watches is 30 seconds a week) and they have no automatic connection with the time wire, but are to run independently, though being compared with the observatory standard daily. The man in charge must not touch one of their hands any more than he would that of a millionaire's daughter, the regulating being all done by adjusting weights on the pendulum. The use of a sufficient number of clocks of this high grade also obviates the uncertainty attendant upon the other system when connection with the observatory is cut off for several days at a time, as sometimes happens. Doubtless many poor watches have been encouraged to try to fulfill the mission of good ones by the opportunity of being set right every day, this being the case, every ommission of a day by the time wire multiplies the uncertainty.

This renewal of clocks involved an "incidental" expense of about $4,000, at which a manager looking wholly at the time when he should desire to place a small expense account before the directors' eyes, might well hesitate; but the Erie now has the satisfaction of knowing that its timepieces are substantially perfect, so far as the present stage of the art can warrant, and it is telling its men by example as well

* Probably on Sunday, March 4.

as by precept that nothing but very "close" behavior on the part of timepieces will be approved.

The first step in adapting the uniform code was to compare it with the old rules. To this end a convention of the superintendents, train-masters and chief dispatchers of the whole system was held, at which the whole code was gone over item by item. This meeting lasted several days and the rules were analyzed in the most exhaustive manner. This may seem like undertaking an unnecessary task; like doing the work of the Time Convention committee over again; but no principle is clearer than that intelligent men to do intelligent work should know the reasons why they do it in the way do; and officers can learn the why and wherefore of the new rules easiest and best by meeting in a body and discussing them in the light of the experience of many individuals. They may thus be led to give up their old methods and adopt the new with interest and enthusiasm, and not merely because the general manager requires it. Of course, such a large body of men had a great variety of views; their ideas of the necessity for certain rules and of the rationale of various movements differed considerably. The changing of these views was not attempted in an arbitrary manner. An adjournment of three weeks was taken, and the matter again taken up; and the wisdom of this was well shown in the way in which objectors had, by calm study and comparison at home, come to cheerfully agree to points which at first they could not be induced to favor. A third meeting was also held. After the code had been agreed upon (very few changes having been made) it was printed and distributed to the dispatchers and trainmen in December, so that they could have ample time to study it with care. Copies were also given to the brakemen and firemen with the notification that they would be welcome at the examinations. Next a committee of chief dispatchers went over the road instructing the subordinate dispatchers, who were necessarily unable to attend the conventions. This instruction was not a mere reading off of the rules, but was virtually a condensed repetition of the discussions previously held. Thus by a considerable body of men spending a large amount of time, the officers mentioned have arrived at a satisfactory state of agreement and understanding of the new code, which involves some radical changes from the Erie's present practice.

The process here described is now being repeated in substance with the conductors and enginemen, so that the management of the road can feel that they are to not only have the benefit of the best code of rules yet devised, but that they have done what in them lies to give the men who are to bear the responsibilities of operation an intelligent comprehension of those rules. The conductors and enginemen cannot be lifted in a day from the ordinary grade to a higher grade of efficiency. There will still be men who take chances and depend upon co-laborers, or upon a big but illy defined margin of safety; but the division officers are engaged in a large task which cannot fail to improve their force.

A synopsis of the changes made in the code will be found in another column.

The Relative Safety of Chilled and Steel-tired Wheels.

Any discussion on the subject of wheels for passenger service generally turns upon the relative merits, especially as regards safety, of chilled and steel-tired wheels. Some remarkable figures as to the relative mileage, etc., of wheels were given in the recent discussion at the New England Railroad Club, which will be found on another page, and may be supplemented by some figures as to failures of steel-tired wheels in England, which are given below. It appears that 1 in 10,000 of the tires used in freight service on the cars belonging to the English railroads fail annually, and that none of the tire failures in 1886 injured a single person. On the Pennsylvania the number of chilled wheels which fail annually is stated at 1 in 250 of those in service. This figure corresponds very closely with the average results obtained with all sorts of wheels on German railroads, where 1 in 300 failed, but it is immensely inferior to the English figure, 1 in 10,000.

These results may be compared with those obtained on the New York, Lake Erie & Western in 1884. Out of a total of 300,000 wheels in use, 18,000 were removed in that year. Over 3,900 of these wheels were cracked or broken. It follows, therefore, that on this one American railroad the number of wheel failures was over four times as numerous as on all the railroads of Great Britain combined, and were nearly as numerous as those on all the German railroads. A large percentage of the failures on the Erie were due to the poor wheels of certain makers. Taking the wheels of the six best makers, 1 in 158 cracked or broke during the year, while of the wheels furnished by twelve other makers, no less than 1 in 12 broke or cracked during the year.

It is, however, startling to find that even the wheels of the best makers give so large a proportion of broken or cracked wheels as 1 in 158. Compared with the English record of tire failures in freight service, the chilled wheels show 60 times the number of failures in a given number of wheels. It need hardly be pointed out that wheels are here more heavily laden, have to stand greater variations of temperature, and run over rougher frogs and permanent way. All these factors should increase the number of failures here, but, on the other hand, the speeds are higher in England, and when all the varying circumstances are taken into consideration, it cannot be denied that the difference of 60 to 1 cannot be entirely caused by the difference in load, climate and roadbed, but must in some measure be due to inherent defects in the cast-iron wheels in general use. Greater care and skill will effect a wonderful improvement, but even then the records show that in point of safety they are far behind good steel tired wheels.

The President of the New England Railroad Club stated at the last meeting that one of the most disastrous accidents the world ever saw was caused in England by the breakage of a steel tire. This is incorrect, though several serious accidents happened in England through the breakage of *iron* tires before the introduction of steel tires. These fractures generally occurred through defective welding or excessive shrinkage. Even these accidents would in all probability have had no fatal result had a proper system of fastening been then invented. It is obviously unfair to condemn the steel tired wheel of the present day on account of accidents caused by the welded iron tires of a former generation. The safety of English steel tired wheels may be clearly demonstrated by the following figures taken from the British Board of Trade Returns. During the year 1886 a total of 866 tires failed, the great majority, 673, splitting longitudinally or bulging. Out of the total number only 280 were on vehicles owned by the railroads, and only 137 were steel tires. Only 20 tires failed on passenger cars, and 18 on baggage and caboose cars. As there were 37,530 passenger cars in use in the middle of that year, it is evident that only one tire failed for 1,876 cars. As English passenger cars have on the average 6 wheels, it would follow that in passenger service there, only one tire failure occurs to about 11,000 wheels per annum. The record for freight service is nearly equally good. Only 218 tires failed on nearly half a million freight cars belonging to the railroad companies, which gives approximately one tire in 10,000 as having failed in any way during the year in freight service. None of the tire failures resulted in the injury of a single person, and the solitary wheel failure recorded was also attended with the same fortunate immunity. In face of these figures it is useless to deny that a properly constructed steel tired wheel can be made to run with practically absolute safety.

Steel—Its Properties and Uses.

The abstract of Captain William Metcalf's paper on steel, which appeared in the *Railroad Gazette* March 18, 1887, gave its substance, but necessarily none of the discussion. The whole paper, as it now appears, in the June, 1887, number of the Transactions of the American Society of Civil Engineers, with additions by many able men, is a most important monograph on the nature and properties of steel. Even the misinformation contributed by some of those who spoke in the discussion has its uses. It lightens the reading of much that is severely technical.

It is perhaps to be regretted that so much of the discussion should have turned on the question of casting or building up heavy steel guns, for this is but a secondary consideration in Mr. Metcalf's paper, and the use of steel for artillery must be relatively an insignificant part of its consumption in this country. Indeed, we have been told by pretty good authority that guns, shells and artillery appliances have been in weight probably not more than 5 per cent. of the total output of the Krupp works, which have so largely supplied the armies of Europe. We do not under-estimate the importance of providing our harbors and coasts with proper means of defense, and adequate artillery. It is not reasonable to suppose that our long immunity from foreign war has been due alone to our geographical position and international policy. It must not be forgotten that for years, down to some time after the close of the civil war, our artillery, our coast defences and our ships available for naval operations, combined to make an attack on our coasts a most hazardous operation for the greatest naval powers. Nor would we belittle the importance of determining the best way of making heavy guns before our government spends much money in them. But discussion cannot settle that question. It can only be settled by making and thoroughly testing heavy steel cast guns, and in the absence of facts drawn from experience the discussion was certain to take, as in the case under consideration it did take, a more or less polemical form, with some personality, patriotism and theology injected. We are all profoundly interested, however, in the properties of steel, and in its behavior in engineering structures, and its uses in peaceful industries. It was in this discussion that Mr. D. J. Whittemore said, "In general it may with truth be said that many of our engineers are as ignorant of this subject as we were when Scott Russell drew marked attention to, and warning of, its peculiarities, thirty years or more ago."

The true importance of this paper and discussion is in the light thrown upon the working qualities of steel and upon the modification of those qualities under treatment. It is the manipulation of steel and the effects of temperature rather than its chemistry that Mr. Metcalf would have engineers study in the present state of knowledge. He believes that our knowledge of the effects of certain chemical constituents is so limited, and our power to produce the same physical results with the same chemical composition is so small that it is useless to specify a certain chemical constitution in addition to the physical requirements.

He points out, in a singularly attractive style, the effects of temperature and of rate of cooling on the internal structure of steel. He says, "It is a remarkable and probably the most important property of steel that no matter what the grain may be, no matter how coarse from over-heating or how irregular from uneven heating, if it be heated uniformly to the refining heat, and kept at that heat long enough, the crystals will change in size and will all become small and uniform." Nevertheless, *over*-annealed steel will not harden and will not temper, and only by melting can be made fit for use. But even this expert, after 28 years of shop experience, attempts to give no data of the time required for annealing or to tell from analysis what change has taken place in over-annealed steel to make it so worthless. Mr. Metcalf does not believe that iron and steel crystallize in service from repeated vibrations, strains or shocks. On the contrary, he considers it more reasonable to suppose that when an axle or crank-pin breaks, and develops in the interior large fiery and weak crystals, those crystals were formed there by too much heat, too slow cooling and too little work when the piece was formed. For large structures and for boilers Mr. Metcalf recommends mild steel, because it is more ductile and not so liable to break under sudden stress and can be safely worked by less skilled hands than are required for the manipulation of high steel, but he warns engineers against falling into the notion that mild steel can stand any amount of abuse and punishment. Care is always necessary, especially as regards heat and, particularly, *uneven heating*.

The proposition at the bottom of Mr. Metcalf's theory of making heavy steel guns, and which was much criticised in the subsequent discussion, is this:

> What I have tried to say, and what I adhere to, is this: I believe a large mass of steel can be treated by heat more surely, more cheaply, and better than by any known mode of forging.

Mr. John Coffin contributes to the discussion an important paper embodying the results of experiments made by him to determine the structural changes in steel induced by heating without mechanical treatment.

Mr. Fink, in his testimony before the Inter-state Commission, suggested that the present rule and practice concerning the car-load limit might perhaps be modified with advantage to all concerned; that the German plan of giving car-load rates on lots of miscellaneous goods in full car-load quantities from one starting point for one destination when consigned to one party, even if shipped by several different ones, might be adopted here. This is worthy of attention, and Mr. Fink might perhaps have gone further. By the plan proposed by him the road is guaranteed a full load and has no additional work or expense except that consequent upon dealing with several shippers instead of one; possibly a guarantee of a smaller quantity or of a large quantity consigned to two or more parties at destination would not be too great

a concession. Perhaps two or three different limits ought to be established. As was pointed out by the complainants at Washington, 12 tons is a mere arbitrary limit when a large share of the cars now in use will carry 20 tons. The fixing of two or more grades or limits is, in fact, not new. Some roads formerly charged all shipments of 500 lbs. or less at first class; others put the limit at 1,000 lbs. Ten thousand pounds at less than ordinary L. C. L. rates and more than C. L. rates is a provision not by any means unknown. The primary object in making car-load rates is to save cars, or, in cases where empty cars are going in the direction desired, to save the time of cars and expense of switching them. This being the case, the carrying of two lots of flour of 75 barrels each shipped on the same day and to be unloaded at the same freight house is substantially the same as carrying a straight car-load of 150 barrels. The advantage of car-load rates in cases like this is now often secured by agreement between shippers, and the sending of a number of small consignments in one car and all addressed to the *shipper*, to be distributed by an agent, is one of the commonest modes of sending freight. The question is, Would the road lose anything by performing the service which is now done by this agent? The former practice of charging higher rates per pound on 300 lbs. than upon 1,500 was no doubt justified so far as cost was concerned, as shown by Mr. Fink's calculation. But when tariffs of this kind are once reduced it is not easy or pleasant raising them. The rates in question have been voluntarily reduced for the sake of simplicity, and the courts would doubtless hold that one of the duties of the carrier under its franchise is to equalize slight inequalities of this kind. Local passengers have to be carried on five-mile trips for a few cents, over portions of a road costing $100,000 per mile the same as over other portions costing one-quarter as much; and the courts say that this is the simple duty of a railroad. If it costs a dollar to carry a single barrel of flour from one way station to its next neighbor it by no means follows that $1 can be rightfully charged. Twenty-five cents is doubtless much nearer right.

A serious accident occurred lately to a fast passenger train at a facing point switch turning out from the outside of a slight curve at Steamburg, N. Y., on the New York, Pennsylvania & Ohio. The engine and three coaches passed all right. The rear car, a Pullman sleeper, in some way got on the wrong side of the point, and crashed into the rear of a freight train on the siding, killing two of the freight train crew and two passengers, and injuring eight others. A contemporary, assuming that this was a split switch, states that "no facing point switch can ever be made absolutely secure against this class of accident until a new form is invented." *Absolutely* secure, perhaps not. A certain venerated professor of physics used to say, "Remember, gentlemen, there is nothing absolute but God." Relative safety, to a much higher degree than is generally attained, can, however, be got with split switches and facing points. The locking bolt insures the switch being exactly home and locked before the interlocked signal can be lowered, and the detector bar prevents throwing the switch under a train. Unfortunately these safeguards are not so commonly used as they might and should be, but their functions must by this time be well known to most intelligent railroad men. Doubtless within the next few years great progress will be made in protecting junction points and facing switches with proper signals, interlocking the signals and switches so that a clear signal cannot be given with an open switch, and further locking the switch so that it cannot be opened accidentally by the breakage of a switch rod.

The derailment on the Delaware, Lackawanna & Western on Monday, in which about 400 head of cattle were thrown over a high embankment and killed, seems to have resulted from very common causes, though it will entail a large bill of damages, not to mention the sufferings of the poor animals. The newspapers reported that the engine broke loose from the tender and that the automatic air brake failed, and exercised their imagination in other respects; though the two hypotheses mentioned are incompatible, as a break-in-two would be almost certain to exhibit the efficiency of the brake if it were in use. The true cause is believed by the officers of the road to have been, not fast running, but a broken journal under the second car from the engine. The cars, 23 of them, were those of the American Live Stock Express Co. and were fitted with the Westinghouse freight brake, but it was not connected at the time of the accident. The locomotive was equipped with the American steam driver brake, and we learn that it did not break away from the train.

It is stated that a momentum brake which is as cheap as any known buffer brake and is more perfect in its action than any continuous brake, will shortly be brought before the railroad world.

These claims are made on behalf of the Manomatick brake, a device which is being constructed and the details of which have not yet been made public. It is understood that the mechanism of this brake is contained in a small box about 12 in. by 6 in., placed beneath the car and connected only to the draw gear and brake rigging. It is stated that this brake will on trial be found to possess the following advantages: 1. No special couplings of any kind are needed between the cars. 2. The brake of each car is independent. 3. The brakes release instantly in response to draw-head extensions. 4. Brakes can be applied and released an indefinite number of times in rapid succession, and can be kept on indefinitely without loss of effectiveness. It is also claimed to be free from the following disadvantages of existing types of buffer brakes. 5. No use is made of the car axles. 6. It is instantaneous in action throughout the length of the train. 7. There is no shock. 8. It is perfectly automatic, or rather the brakes are applied on the rear section in case of breakaway. 9. The brakes cannot leak on or be applied when not wanted, as the brakes are always off when a car is being pushed, backed, kicked or hauled. 10. The brake can be graduated. 11. The appliances used are cheap and not likely to get out of order.

It is obvious that the truth of these startling assertions can only be tested by carefully conducted trials with long trains. The results of such trials will be awaited with much interest.

The latest and biggest plan for providing New York City with proper railroads is that of Mr. Heman Clark, who proposes a tunnel to start near Fleetwood Park, pass under the Harlem and down the whole length of the island to a point about the latitude of the Post Office. Here it will bifurcate. One tunnel will go under the North River and Jersey City, and come to the surface on the Meadows, west of the Bergen Hill. The other will go under the East River and Brooklyn, and come to the surface near Flatbush. It is proposed that this tunnel shall be at least 150 ft. below the surface, and it is to cost about $30,000,000. There is room enough in the bowels of the earth, beyond any question, for all the "rapid transit" routes that New York needs. If engineers and moneyed men can be found to put reputation, work and cash into burrowing out a great subterranean railroad, 15 miles long, from Westchester to New Jersey and Long Island, they ought not to be discouraged. It is magnificent, but is it war? Could such a road, with its terminals, shafts, elevators, local stations and subterranean sidings be made for $30,000,000 or for $50,000,000? If constructed for the larger sum, could it earn a reasonable interest on that sum? At least the project is simple and grand, and has greater possibilities than any other yet proposed.

Many will be surprised to hear that a man who knew James Watt lived to see the dawn of the present year. This gentleman, Mr. Thomas Lockhart, who recently died in Glasgow, at the age of 97, had literally in a lifetime seen the virtual birth of the steam engine, and had witnessed its marvelous growth and the corresponding advance in all branches of mechanical engineering. The startling nature of this rapid progress is well illustrated by a remark in a letter of James Watt, where he observes that he had just made a piston that fitted the cylinder so truly that a half-crown could hardly be inserted between them at any point of the bore. As this coin is larger than a silver half dollar, the accuracy of workmanship in those days seems to belong to another age. And yet it has been compassed in the lifetime of one old man. It is said that Mr. Lockhart preserved a vivid impression of the great inventor, and was always pleased to recall the circumstances which brought them together.

Two thousand men are still continuing their efforts to rescue the passengers on the mail train on the Ailberg Railroad, which was buried by an avalanche. An avalanche swept down upon a cottage built on the side of a mountain and crushed it to pieces. Its occupants, a watchman and his wife were killed.

This line, crossing the mountains between Switzerland and Austria, runs along the northern or sunny slopes of steep valleys running east and west and subject to heavy snow falls. Difficulties from accumulated snow and avalanches were anticipated when the line was built, and the precautions taken were referred to in our article describing the line some years back.* The thermometer often falls to 30 degrees below zero, and the winter lasts seven months, the snow remaining unmelted for a much longer period. The summit is 4,372 ft. above the sea. The winter in Europe appears to be unusually severe, and some trains have been snow bound in the South of England, where the snow fall is rarely heavy.

The experiment of carrying milk by boat which the Housatonic road has been trying between Norwalk, Conn., and New York City, seems to be not very successful. The dealers say that the delays in cold weather were such that the most appropriate use for the milk on arrival was the making of toboggan slides. The farmers threaten to withdraw their shipments unless all rail transportation is used.

Reports of gross earnings from 51 roads for the first week of February show gains of 16.9 per cent. over last year. The mileage increase of the same roads is about 6 per cent.

The tables of distances and rates for freight on the lines of the Orléans Railroad of France are on sale in all the stations of the system. The company now announces that for a yearly subscription of three francs, it will send from time to time bulletins of all changes in rates and classification.

A correspondent calls attention to the fact that more than 40 years ago a patent was issued in England which shows and claims spring buffers at or near the roof of passenger cars. Whether or not this fact was brought out in the Pullman-Wagner does not appear.

The account which is given in another column of the successful use of a device for scraping sand off the rails behind the locomotive, states that 20 cars could be drawn up a given grade when the device was in use, and only 18 when the sand was allowed as usual to lie on the rails. This may be taken as proving that the presence of crushed sand on the rail increases the resistance of the train, and that this sand can be removed by the use of a sweeper. Experience alone can show whether the steel brushes used will be durable.

The Forth bridge is steadily progressing towards completion. The central towers are completed to their full height and the cantilevers have been built out for a distance of about 150 ft. The approaches are finished, and nearly all the steel work is on the ground and either in process of erection or being drilled, planed, etc., in the contractors' workshops at the site of the bridge. Mr. Elward Cooper, the resident engineer, estimates that the first train will run across the great structure in the month of October, 1889.

Iron states that it is doubtful if the meeting of the Iron and Steel Institute of Great Britain will be held in the United States or Canada this year, as proposed.

NEW PUBLICATIONS.

Steam Boiler Explosions, in Theory and in Practice. By R. H. Thurston, M. A., Doc. Eng., N. Y. John Wiley & Sons, 1887. 12mo, pp. vii., 173.

With rare exceptions, treatises on steam boiler explosions are usually written for the purpose of airing some special theories; and it is a real pleasure to see such a work as the present, wherein the reader is informed that:

"Explosions probably always occur from perfectly simple and easily comprehended causes, are always the result of either ignorance or carelessness, and are always preventible where intelligence and conscientiousness govern the design, the construction and the management of the boiler. A well-designed boiler, properly proportioned for its work and to carry the working pressure, well built, of good materials, and intelligently and carefully handled, has probably never been known to explode."

In justification of the foregoing statement the reader is informed that in the United States and Great Britain, about one boiler in 10,000 explodes among those which are regularly inspected and insured, while the number of explosions among boilers not insured is ten times as great in the United States, and twenty times as great in England; and it is well added that: "Explosions might become almost unknown were a proper system of inspection and compulsory repair introduced."

The work opens with a consideration of the energy stored in the water of a steam boiler, with tables and illustrative examples showing that, even at low pressure, the destructive force is very great in case of rupture. The principal causes producing rupture are intelligently discussed, and nearly all the theories on the subject are considered; the monograph on the spheroidal condition of water being of special interest and value. This work ought to be in the hands of every steam user, and if its directions are heeded, boiler explosions will become rare.

Although the treatment of the subject is usually very clear, there are a few passages in the book which, from inadvertence or careless proofreading, are not very intelligible. For example, the formulas and calculations for the time required to produce a dangerous pressure, p. 93, are not at all clear, on account, apparently, of numerous mistakes in the text, and the meaning of the following paragraph is by no means plain:

"While it is true that the heat supplied by the furnace-gases is absorbed by the boiler to the same extent, practically, without much regard to the thickness of the plates of the boiler, it is a well-known fact that the resistance of iron to the flow of heat is so great that the effect of heat on the metal itself is seriously modified by the thickness of the sheet."

These are minor matters, for such inadvertences are few in number, and the general character of the book is unusually meritorious. The work ought to go through several editions, so that slight inaccuracies can readily be corrected

The Graphical Statics of Mechanism. By Gustav Herrmann. Translated and Annotated by A. P. Smith, M. E. N. Y.: D. Van Nostrand, 1887. 12mo, pp. ix., 158.

The consideration of the forces acting in complicated trains of mechanism, when conducted by the analytical method, becomes so much involved, if all elements of the problem are taken into consideration, that it is rarely attempted with success. A graphical solution, on the contrary, dispenses with the higher analysis and can be readily understood and used by persons who are familiar with the elementary principles of mechanics. In the work under consideration, an attempt is made to introduce all the forces which are developed in moving mechanism, both the prejudicial and useful resistances, thus rendering it possible to determine the efficiency or useful effect of various machines by simple graphical constructions. The explanation of self-locking devices, such as differential hoists, screws and wedges, is rendered very clear by these constructions, and this little book will be found useful, both by professional men and as a text-book in engineering schools. The illustrations are numerous and clear. The translator has done his work well and has added a number of explanatory notes.

A Text-book on Roofs and Bridges. Part I. Stresses in Simple Trusses. By Mansfield Merriam, Professor of Civil Engineering in the Lehigh University. New York, John Wiley & Sons. Pp. 118, 8 vo. Price, $2.50.

In his preface the author says that the course in roofs and bridges given to the students of civil engineering in Lehigh University consists of four parts; first, the computation of stresses in roof trusses and in all the common styles of simple bridge trusses; second, the analysis of stresses by graphic methods; third, the design of a bridge, proportioning its de-

* See *Railroad Gazette*, Oct. 24, 1884.

tails and making the working drawings; and fourth, the discussion of cantilever, suspension, continuous and arched bridges. In the volume before us the first part of this course is presented. By the plan adopted the principles and methods are established and numerous numerical examples are fully worked out to illustrate them and their applications. In most cases the minimum as well as the maximum stresses have been computed with a view to familiarize the student with the effect of the live load This work consists of three chapters, viz.: Stresses in Roof Trusses, Highway Bridge Trusses and Railroad Bridge Trusses. In the latter chapter the author gives the most modern practice in determining the stresses due to moving loads, taking actual typical locomotive wheel loads, and reproduces the Phœnix Bridge Co.'s diagram for tabulating wheel moments. The whole treatment is concise and very clear and elegant.

The catalogue of the publications of Messrs. John Wiley & Sons, 15 Astor Place, New York, is received. This catalogue is, as usual, classified by subjects and alphabetically arranged by authors, with an index to authors and a general index. Any description of it would be superfluous. The publishers will send a copy to any address.

A catalogue of contractors' supplies is issued by Messrs. Byan & McDonald, Waterloo, N.Y. The catalogue includes dump cars, steam-shovel cars, contractors' cars, derrick fixtures, winches, hoisting drums, hoisting engines, light locomotives, portable engines and boilers, water-pipe, stand-towers, etc.

We have received from M. G. Pedone-Lauriel, 13 Rue Soufflot, Paris, a catalogue of works on law and jurisprudence. It is an admirably classified list of a great number of French works. Among those of probable interest to American technical students, we notice a Manual of Patent Laws of France and other countries; a Manual of the Law of Workshops and Factories; the Transportation Code as affecting carriage by rail of merchandise and passengers and the Code as affecting local railroads.

TECHNICAL.

Foreign Technical Notes.

A short resumé of the spread of the Von Borries-Worsdell type of compound locomotive is given by Herr Von Borries in the first number of the German *Organ* for 1888. This shows the number in use in the years from 1879 as follows:

1880	2	1884	18
1881	2	1885	43
1882	4	1886	56
1883	14	1887	100

A detailed list given by the author shows 143 locomotives either building or in use on Oct. 1, 1887, in all parts of the world. It will be borne in mind that this includes only the engines of this particular type, and not those of other design, notably of Webb in England and Mallet in France. Herr Von Borries states the average economy of fuel at 15 to 20 per cent. The very considerable economy of water in compound engines will appeal to many managements, particularly on some of our Pacific railroads.

Speed registration by electrical contacts at uniform distances apart recording the passage of trains on a strip of paper moved by clockwork continues to excite favorable comment in Germany. Such a system, recording as it does at once the speed of a train and its position on the road, seems an eminently practical form of speed registration.

Mustard oil is advocated by Herr Thier in the Austrian *Railroad Journal* as superior to all other oils as a lubricant in the proportion of very nearly 2 to 1 as compared with the best, while it remains perfectly fluid at a temperature as low as 14 degrees Fahrenheit, and can be kept for years without becoming rancid.

The Westinghouse Brake in Australia.

In the *Railroad Gazette* of Jan. 27 it was announced that the Westinghouse brake will be used exclusively on the railroads of Victoria. Further accounts say that the Victorian Railway Department has resolved to abolish the Woods brake in favor of the Westinghouse brake. An arrangement has been come to by which the Woods brakes will be converted into an adaptation of the Westinghouse brake by the use of compressed air as a motive power instead of water.

Solid Steel Wheels.

The Pittsburgh Steel Casting Co. have lately commenced the manufacture of solid steel car wheels by a newly invented method. The wheels are cast in the manner first used by Mr. F. W. Webb at Crewe, the molds rotating swiftly while the metal is cooling. The gases thus collect in the centre of the wheel, which is bored out for the axle, and the metal flows outward by centrifugal force, leaving the body and especially the tread perfectly solid. After the wheels are cast they are reheated and rolled out on the tread and flange until they are perfectly round and hard on the wearing surface thus making the wear on the rails and springs less. The wheels are said to have the advantage of great strength and durability, while made much lighter than even the paper wheel. The price will be placed at 4 cents per lb. This makes them a little more expensive than cast-iron wheels, but they are still very much cheaper than either paper or steel built wheels.

The Pennsylvania road's wheel test is five drops of 140-lb. weights at 12 ft. One of the new steel wheels was this week subjected to a test of this character. The drop was a distance of 12 ft., and as follows: First, 40 drops of 163 lbs.; second, 10 drops of 217 lbs., and third, 3 drops of 280 lbs. At the fifty-third blow with the drop of 280 lbs. the wheel cracked. The test was then continued. 10 drops of 163 lbs. and 11 drops of 280 lbs. At the seventy-fourth drop the wheel broke. The figures indicate that the wheels are superior in strength to cast-iron wheels, but are hardly equal to wrought-iron spoke or disk wheels, which are only slightly bent under a steam hammer and cannot practically be broken by any means.

Large Redwood Lumber.

The *American Architect* states that few persons outside California know the gigantic dimensions in which redwood lumber may easily be obtained from mills which possess machinery capable of sawing it. At a recent state fair in California several perfectly clear, sound planks and boards, varying in width from 6 to 11 ft. were exhibited. If there were any special demand for such enormous pieces of this unrivaled timber, they would be more frequently seen, but the wood construction of the world has for a thousand years been based on the assumption that sawed sticks measuring more than 12 in. in breadth or depth of section would be costly and difficult to obtain, and a new system must be made to suit the materials of the Pacific Coast, or the redwood logs will continue to be sub-divided into pieces approaching in size the Eastern lumber.

On the other side of the water, the standard of size for framing timber is still smaller than with us. If we are not mistaken, few mediæval cathedrals on the Continent contain a stick larger than 8 in. square in cross-section, and although English timber was of larger dimensions a thousand years ago, there would be little difference now. In pile and trestle work, however, long sticks 18 in. square and upwards are much valued and handsome and perfect planks up to 3 ft. wide and 30 or 40 ft. long are in some demand for the outside panels of passenger cars.

New Railroads in Australia.

Tenders are invited by the Victorian Railway Commissioners for the construction of a railroad to connect Somerton with the metropolitan system. The plans and data of the Kyneton and Redesdale line are in such an advanced state that tenders will shortly be invited.

THE SCRAP HEAP.

Bill Nye's Correspondence with a Railroad.

Bill Nye has evidently had some experience with railroad men, judging by the following extracts from an article which we find in a Western exchange:

A young friend from Ohio asks if there could not be some way suggested by which a business correspondence could be taught by actual experience, similar to the custom of learning telegraphy, by establishing and practicing over a peanut line. * * * Young men who yearn to become fluent as business correspondents should strike up a friendly interchange of thought with the general claim agent of a vigorous railroad. For mutual benefit and improvement it fully equals a much longer correspondence with the pension department. Moreover, a general claim agent will frequently squirt original thought and droll conceits and epigrams into his correspondence, which you cannot hope to find even in the more polished work of the pension department. * * * Let the young man who wishes to write letters which will be thoroughly courteous and unimpassioned, open a correspondence with the pension department; but should he desire to cultivate a gentle air of subdued mirth in his letters, a sort of chastened devilshness, if I may be allowed to use such a term, let him buy $11 worth of society stationery and begin to inquire about the breakage or side-trackage, or leakage, or shrinkage, or stealage connected with the transportation of goods by a large railroad.

* * * Some years ago, while engaged in the act of growing up with the country out West I sent East for some butter to be shipped by rail at once, butter that was made from real cream distilled from the luscious cow. I received notice that the butter had been shipped. Part of it arrived. Only 20 lbs. out of 80, but the freight bill on the whole amount got in one day ahead of the 20 lb. tub. I paid the bill, and, not knowing any of the officials but the general passenger agent, with whom I had held some correspondence, I wrote to him. He wrote me coldly, that such claims should go to the general freight agent. I wrote to the general freight agent in a tone of pleasant banter, asking him to return the butter; that I liked fun just as well as anybody, but that it had gone far enough, and that if he would send on the rest before it acquired that peculiar bouquet which comes to butter when it is in its full meridian, I would be obliged. He wrote me asking for the bill of lading or way bill or manifest, whatever it was, stating also that the letter was dictated. I had a long correspondence with him, and throughout the whole blindly infatuating interchange of thought he never came right out and said that these were his sentiments, but always claimed that each letter was a dictated letter. He did not tell me who dictated them.

In the meantime my butter was probably side tracked in a small place, seeking madly to get out and shrieking for air. I was going to say wildly tearing its hair, but it was not that kind of butter. The general freight agent wrote to me at last that he had sent a tracer after it. I went home and told my wife that the general freight agent had sent a tracer and a St. Bernard dog out in search of our butter. Some time then elapsed, though we had been eating bacon gravy on our bread two years, when a letter from the general freight agent, addressed in a beautiful Spencerian hand with bloated capitals, was received and contents noted. In business correspondence contents are invariably noted. The general said that the tracer had just returned, though fatigued, I judged from the wonderful word-painting of the letter. In my mind's eye I could see the tracer, with its tongue out about four inches, sinking down exhausted in the general freight office. The letter stated that the return of the tracer had demonstrated the fact that the butter was lost. * * He wrote once more to state that the matter had been turned over to the auditor, and that he begged leave to subscribe himself my friend and well-wisher, and to repeat with even greater earnestness than ever that this was a dictated letter.

The auditor reproved me sharply for sending so far away for butter, and then went to Florida to seek much needed rest. I then fell into the hands of the first assistant auditor, who enjoyed signing his name to statements which did not in any way compromise him. * * * I never got the butter, but I obtained a terse English style of erecting Gothic sentences, banked up with odd little three cornered adjectives that I could have secured in no other way. I was paid for the butter at last. * * *

Quite an Extensive Accident.

The Nor-Nor-Western Daily Blizzard and General Scorcher has evidently noticed that some engineers let the sand run for quite a considerable distance, for our rural contemporary calmly announces that "a great land slide has occured on the line of the California & Oregon Railroad, covering one hundred miles of track."

Railroads, as a general rule, don't lose millions of dollars worth of property at such short notice, except in Wall street.

The Wall Street Daily News states that the newest car heating invention is superheated pipes to place under the feet, with a mustard plaster on the head, which draws the heat through the whole body. The ends of the (car) body may be warmed by such means, but something appears to be required for the centre portion. In some non-prohibition states hot Scotch is used for this purpose.

Earnings of Indiana Roads.

A statement of the earnings of Indiana roads for the year shows that the receipts last year were larger than those of any previous year, the increase over 1886 amounting to $9,187,919. The Indianapolis, Decatur & Springfield was the only road that failed to increase its earnings.

A Conductor Sueing for Damages.

Andrew J. Carberry, Pullman car conductor, who was tried in Chicago last week on a charge of stealing the company's fares on the route between New Orleans & Chicago, and acquitted, has brought suit for $50,000 damages against the Pullman Car Co. and the American Surety Co.

Some of the Troubles of a Receiver.

Gen. McNulta, receiver of the Wabash, has filed a petition before Judge Gresham in which he mentions the annoyances to which he has been subjected by having garnishment proceedings brought against him on account of debts owing by the numerous employés of the road. The road is 1,000 miles long, and he is constantly summoned to attend cases brought before Justices of the Peace all along the line. Three-fourths of the claims are for less than $15, and one was only 80 cents. The costs on this suit were $5, and the employé paid it to save trouble, though he denied it was due. A majority of the claims are for liquor bills, and many of the suits are brought, the receiver says, in order that costs may be rolled up for the benefit of the justices. It is practically impossible to compel the employés to settle their debts without suit, for some parties would take advantage of such a rule to oppress them. The law has recently been changed so as to permit suits against receivers without order of court, but the receiver thinks this does not include garnishment proceedings. He says his time is so much taken up with these little matters as to interfere with more important business, and suggests that the judge require all parties to file their claims in court instead of beginning garnishee suits.

Dakota Railroads.

The Railroad Commission, of Dakota, in its third annual report says: "* * There have been gratifying reductions of freight and passenger rates in North Dakota. * * Twenty-eight persons have been killed and 186 injured in accidents during the year. The Commission has licensed 241 elevators, with a capacity of over 8,500,000 bushels. In addition 265 elevators have applied for licenses, and 308 are doing a private business. The principal complaint has been in regard to the grain blockade, for which the system for marketing grain is largely responsible. The Commission urges farmers to build their own granaries and market their wheat at their leisure.

French Cars with American Modifications.

The administration of the state railroads of France has made a contract for certain passenger cars with central aisle, to be delivered March 31. These cars are for special trains, to be made up of one first-class car, with four compartments, each with six seats, and one sleeping compartment with three seats; one second-class car, with six compartments of eight seats each; and one-third class car with seven ten-seat compartments. The *Journal des Transports*, from which this information is taken, adds that each train will have a water-closet.

A Live Stock Express.

A Buffalo dispatch states that a company to be called the American Live Stock Express Co. has been formed to undertake the transportation of live stock in special cars provided with feeding and watering facilities. It is said that the service performed will be the same as that done by a parcels express, the company employing men to care for the stock in transit, entirely relieving the shipper and railroad company from expense and care. The headquarters of the company is in the Mills building, New York. It is expected to begin business about March 1. For the present the company will confine its operations to the Grand Trunk and Delaware, Lacawanna & Western roads. It is claimed that trains will be run from Chicago to New York in 40 hours.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

In Iowa a township voted a tax in aid of a railroad payable when a certain number of miles of the road had been built, in return for which each taxpayer would be by law entitled to a certain number of shares of stock. Before the construction of the road was begun, the railroad contracted with another company, stipulating that, before a certain date, it would complete 50 miles of its road to a junction with, and then sell all its property to the latter railroad; taking its stock in payment. This contract was signed by the officers, and approved by the directors of both railroads, but never submitted to the stockholders of either. Over a year later, after the first road had built miles enough of road to earn the voted tax, and had finished the stipulated 50 miles, the agreement for sale was canceled by the officers of both roads, and the cancellation approved by the stockholders of the first company. On the same day, a formal conveyance of all its property was made by its officers and stockholders to the connecting road. It appeared that the connecting road furnished the money to build the first road, and, before the conveyance owned about all the stock. The Supreme Court holds that the contract amounted to a sale of all the property, and being done before the tax was earned, payment of the tax could not be enforced; and that the taxpayers were not obliged to take stock of the connecting road.[1]

In the same state the Court decides that the section of the code providing that railroad corporations shall be liable to persons or employés for damages sustained by neglect of agents, mismanagement of engineers or wilful wrong by them or other employés, when connected with the use and operation of a train, is not in conflict with the fourteenth amendment to the constitution of the United States.[2]

In the same state the Supreme Court rules that the president of a railroad has no power, without special authority, to let a contract for the construction of the road.[3]

In Minnesota the United States Circuit Court decides that railroad service known as "switching" is local, and the charge made for it is not a part of the through rate fixed beforehand, and has no reference to inter-state shipment, but may be regulated by a commission appointed under a state act by virtue of the police power of the state; also that the compelling of a railroad company to comply with an order regulating rates made by a commission appointed under the Minnesota act of March 7, 1887, for regulating common carriers, is a due process of law, and in such a case the company cannot be heard to complain that the act of the commissioners operated to take the property of the company for public uses without process of law.[4]

Carriage of Goods and Injuries to Property.

In a case in the Federal Court, in Texas it appeared that on Jan. 28, 1887, a merchant in Austin entered into a contract with the agent of a receiver of a railroad for shipment of goods from New York to Texas at cut freight rates. The steamer at New York refused to receive the goods, and Feb. 12, 1887, the receiver guaranteed the contract, and the goods were shipped March 1. On March 4 the merchant was informed that the time had expired, and the former rates re-

stored. He testified nothing was said to him as to limitation of time of shipment; the agent of the receiver was under the *impression* he had mentioned it. The circuit judge decides that there was no condition as to immediate shipment, and that the merchant may recover back the freight paid by him in excess of the cut rate.[5]

In Indiana a shipper sued a railroad for damages for the failure to perform its agreement to transport staves and headings at as low a rate as a line of road upon which the plaintiffs' manufactory was situated, if the plaintiffs would remove such manufactory to the line of defendant's road. The plaintiffs had staves and headings of the value of $15,000 at a station on the line of defendant's road, which they were willing and anxious to have the defendant receive and transport; and they often demanded of it, during the time the goods were so on its line, that it furnish cars, and transport the staves and headings according to its contract, which it wholly neglected and refused to do. The Supreme Court affirms a judgment against the company. The refusal of the company, upon demand, to furnish cars for the transportation of goods such as those described, placed at the station upon its line to be transported, relieved the plaintiffs from making any further delivery or offer to deliver.[6]

In Iowa it is held that a right of action against a railroad for killing stock is assignable.[7]

In Texas, in an action against a carrier to recover for injuries to stock, the carrier set up a contract whereby the shipper agreed, as a condition precedent to his right to recover for injuries to said stock, that he would give notice in writing of his claim therefor to some officer of the carrier, or its nearest station agent, before said stock was removed from its place of destination, or from the place of delivery, to the shipper, and before said stock was mingled with other stock. The Supreme Court rules that the contract was uncertain, ambiguous, and an attempt to protect the carrier from loss occasioned by its own fault, by imposing unreasonable duties on the shipper, and the failure to give such notice was not a defense.[8]

In Missouri goods were shipped by a railroad addressed East St. Louis, Ill., and on their arrival there, the railroad notified the consignee, who lived in St. Louis, Mo., of their having arrived and that they must be at once delivered or there would be charges for storage. The consignee thereupon ordered a transfer company to forward them. The Supreme Court holds that the latter was not a connecting carrier for whose acts the railroad is responsible. The Court says: "The destination of the goods had been reached in East St. Louis, and the Wabash Railway had notified Jacob that they were *ready for delivery* upon payment of freight and charges; insisting on the immediate delivery of the goods, accompanied by a threat of increased charges for delay. In such circumstances, the transfer company was no more of a connecting carrier than would a drayman have been who was employed to cart the goods away; and, upon the foregoing facts, it may be fairly presumed that the Wabash Railway Co. was the *terminal* line."[9]

In Duluth, Minn., the custom is for railroads to deliver grain for the consignee at any of the public grain elevators or warehouses in the city immediately after being inspected by the public inspector. The amount of freight charges to which the railroad company is entitled is determined by the weight of the state weigh-master, who weighs it into the elevator. Upon the weight being reported to the elevator company by the weigh-master, the elevator company reports it to the railroad company and to the consignee. Thereupon the railroad company makes out its freight bill, which is then presented to the consignee, and, upon its payment, gives him a receipt, and also gives the elevator company a statement that the freight bill has been paid, whereupon, and not before, the elevator company issues a warehouse receipt to the consignee. In this case the grain which had arrived over defendant's road consigned to plaintiffs at Duluth, was inspected in part on the 25th and in part on the 26th of November, 1886, and weighed by the state weigh-master, and stored by defendant on Nov. 26 in a public warehouse fit for such purposes for and on behalf of plaintiffs, subject to a general instruction given by the railroad companies to all the elevator companies not to issue any warehouse receipts until the paid freight-bills were presented. On the afternoon of Nov. 27 (Saturday), between 4 and 5 o'clock, the elevator company gave plaintiffs written notice that the wheat had been placed to their credit, accompanied with a report of the weight and grade. The defendant did not present its freight-bill to plaintiffs until Nov. 29 (Monday). The wheat was accidentally destroyed by fire in the elevator on the night of Nov. 27. The Supreme Court holds that the railroad's liability as a carrier had then terminated and it is not responsible for the loss.[10]

Injuries to Passengers, Employes, and Strangers.

In Kansas a section foreman had told employés on his section who had complained of defective tools which they were using, that the company had promised to send new tools in their place. The Supreme Court rules that this promise inures to the benefit of all employés at work on the section in whose hearing and presence it was made; and if, after a reasonable time has elapsed, and the new tools are not furnished, an employé on the section is injured by the use of the defective tool, the company cannot defeat his recovery because the promise was not made to the injured employé individually.[11]

In Virginia an employé while performing his duties as "overbauler" on a railroad, was at work on a branch track fixing a car, and another car was shifted along the same track, and, colliding with the line of cars under which he was at work, caused the injuries complained of. The Court of Appeals holds that the conductor in charge of the shifting-engine was guilty of negligence in shifting the car in that direction without first ascertaining if any one was at work under the cars with which the shifted car might collide, and for such negligence the company was responsible; also, that the conductor and "overbauler" were not "fellow servants," they being engaged in quite distinct departments.[12]

In a Georgia case the cause of an employé's death was the rapid running of the train, suddenly accelerated by putting on additional steam, over a track left in an uneven and weakened condition by other employés of the company, whose duty it was to repair the track in question, and who failed to give warning of the dangerous condition of the road. The Supreme Court decides that the negligence of such employé was the negligence of the company, and that the deceased and the others were not "fellow servants."[13]

In Michigan a brakeman on a freight train was standing on a flat car, and, while the train was approaching a bridge, the engineer signaled for brakes, and, in response thereto, the brakeman immediately sprang and caught the round of the ladder on the side of a box car, and, swinging himself around to ascend, his body came so far out as to come in contact with the trusses of the bridge with such force that he was thrown from the ladder, run over by the train, and killed. The Supreme Court holds that his death "was one of the accidents incident to his employment," of which he took the risk, and for which the railroad is not legally responsible.[14]

In Missouri a pedestrian was killed by being struck by a car which was being shunted by a switch engine. The evidence showed that he was well acquainted with the movements of the trains in that locality; that at the time of the accident he was in earnest conversation with a friend, and had an umbrella hoisted to shield himself from the sun; that the approach of the car was plainly visible to all bystanders, one of whom shouted to him when the car was 60 ft. from him, but that he did not stop, look or listen; that he was struck the instant he attempted to cross the track; and that it was impossible for the brakeman, who was on top of the car, to stop it after he had placed himself in peril. The Supreme Court holds that although there was an ordinance which fixed the speed of trains at 6 miles an hour, the car was going at 10 miles an hour at the time of the accident, the deceased was guilty of contributory negligence, and the widow could not recover.[15]

In Kansas the Supreme Court affirms a verdict in favor of a person injured at a crossing, the jury having found that he was not negligent in looking and listening.[16]

In West Virginia the Supreme Court of Appeals rules that if the servants of a railroad, having in their charge one of its engines and trains running within the corporate limits of a city, to and over a public wharf therein, fail or neglect to give notice at least 60 rods before its approach to such wharf by ringing the bell or blowing the whistle of the locomotive for a sufficient time to give notice of its approach thereto, such failure or neglect is of itself negligence on the part of such railroad. The fact that pedestrians are accustomed to travel on a railroad at a particular place, makes it the duty of such railroad company to exercise greater caution and prudence in the operation of its road at that place. If such company permit a train of its cars to be moved at that place without having some of its servants in position to give warning of its approach, and to control its movements, these facts are of themselves acts of negligence.[17]

In Georgia a man while walking upon a trestle bridge was struck and killed by a train. The whistle was blown and the brakes applied as soon as he was seen by the engineer, but the train could not be stopped. The bridge was about 10 ft. high, over a sandy river bed, the water at the time being less than 5 ft. deep. The Supreme Court being of opinion that the man might have jumped from the bridge and saved his life holds that the railroad is not liable in damages.[18]

In Minnesota the Supreme Court rules that where a highway crosses a double-track railroad, over which trains are liable to run frequently in opposite directions, it is contributory negligence for a traveler thereon, whose view of the second track is obscured by the presence of a passing train on the track nearest to him, to pass immediately upon the crossing as soon as the way is clear, without waiting to look or listen for the approach of a train in the opposite direction on the second track.[20]

In the same state the plaintiff was injured in consequence of a defective step-ladder on one of defendant's freight cars. He was not at the time in the service of the defendant, but of another company, which was then using the car in its own business. The car had been sent over the road of the latter company, which connects with that of the defendant, consigned to a point in another state; but, on its return, it was transferred beyond the point of junction at which it should have been returned to defendant, and was loaded with freight consigned to a distant point on such connecting road. The Supreme Court holds that the defendant owed no duty to the plaintiff in respect to the condition of the car, growing out of contract or otherwise, and that this action cannot be maintained.[21]

[1] Cartellon v. Dubuque & N. W. R. Co., 35 N. W. Rep., 620.
[2] Reyburn v. Cent. Iowa Ry. Co., 35 N. W. Rep., 607.
[3] Templen v. C., B. & P. R. Co., 35 N. W. Rep., 634.
[4] Chicago, M. & St. P. Ry. Co. v. Decker, 32 Fed. Rep., 849.
[5] Easton v. Houston & T. C. Ry. Co., 32 Fed. Rep., 897.
[6] Louisville, New Alb. & Ch. Ry. Co. v. Flanagan, 12 West Rep., 190.
[7] Everett v. Cent. Iowa Ry. Co., 35 N. W. Rep., 609.
[8] Smither v. L. & N. R. R. Co., 6 S. W. Rep., 409.
[9] Nanson v. Jacob, 6 S. W. Rep., 246.
[10] Arthur v. St. P. & D. R. R. Co., 35 N. W. Rep., 717.
[11] Atchison, T. & S. F. R. R. Co. v. Sadler, 16 Pac. Rep., 46.
[12] Richmond & D. R. R. Co. v. Norment, 4 S. E. Rep., 211.
[13] Tonans v. Raleigh & Augusta R. Co., 4 S. E. Rep., 339.
[14] Luck v. Flint & P. M. R. R. Co., 35 N. W. Rep., 708.
[15] Yancy v. W., St. L. & P. R. Co., 6 S. W. Rep., 272.
[16] Wichita & W. R. Co. v. Davis, 16 Pac. Rep., 78.
[17] Nuzum v. Pitts., C. & St. L. R. Co., 4 S. E. Rep., 242.
[18] May v. Central R. & B. Co., 4 S. E. Rep., 331.
[20] Marty v. Chicago, St. P., M. & O. R. Co., 35 N. W. Rep., 670.
[21] Sawyer v. Mi. n. & St. L. R. Co., 35 N. W. Rep., 671.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Chesapeake & Ohio, annual meeting, Richmond, Va., March 15.

Delaware, Lackawanna & Western, annual meeting, New York, Feb. 21.

Illinois Central, annual meeting, Chicago, Ill., March 14.

Louisville & Nashville, special meeting, Louisville, Ky., Feb. 21.

Missouri Pacific, annual meeting, St. Louis, Mo., March 13.

New Orleans & Northwestern, annual meeting, New Orleans, March 5.

New York & Boston Rapid Transit, annual meeting, New York City, Feb. 23.

New York, Rutland & Montreal, annual meeting, New York, March 8.

New York, Susquehanna & Western, annual meeting, Jersey City, N. J., Feb. 23.

Norfolk Southern, annual meeting, Elizabeth City, N. C., March 1.

Northern Central, annual meeting, Baltimore, Feb. 23.

Peoria, Decatur & Evansville, annual meeting, Peoria, Ill., March 6.

St. Louis, Iron Mountain & Southern, annual meeting, St. Louis, Mo., March 13.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Society of Civil Engineers* holds meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street, New York.

The *Engineers' Society of Western Pennsylvania* meets in Pittsburgh the third Tuesday of each month.

The *American Institute of Mining Engineers* will hold its 18th annual meeting in Boston, Mass., Feb. 21.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The *New England Railway Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The *Boston Society of Civil Engineers* holds its regular monthly meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday of each month.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, on the third Thursday of each month.

The Western Railway Club meets in Chicago the third Wednesday in each month.

The *Engineers' Club of St. Louis* meets the first and third Wednesday of each month till June.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *General Time Convention*, spring meeting, will be held in New York, April 11.

The *National Association of General Passenger and Ticket Agents* holds its annual meeting in St. Augustine, Fla., on March 20.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, Burlington & Quincy, quarterly, 2 per cent., payable March 15.

Chicago & Eastern Illinois, semi-annual, 3 per cent., upon preferred stock, payable March 1.

Chicago & Indiana Coal, quarterly, 1½ per cent., upon preferred stock, payable March 1.

Delaware & Bound Brook, quarterly, 2 per cent.

North Pennsylvania, quarterly, 2 per cent., payable Feb. 25.

Association of North American Railroad Superintendents.

The fifteenth meeting of this association will be held at the Southern Hotel, St. Louis, Mo., beginning on Wednesday, March 21, 1888, at 11 o'clock a. m., and holding two days.

The order of business is as follows: The election of members, officers and standing committees; communications; report of Executive Committee, W. J. Murphy, Chairman; of Committee on Roadway, J. B. Morford, Chairman; of Committee on Machinery, R. G. Fleming, Chairman; of Committee on Transportation, Robt. Blee, Chairman; Committee on Frogs, H. Stanley Goodwin, Chairman, and the consideration of such other business as may be presented.

Engineers' Society of Western Pennsylvania.

The eighth annual meeting was held Jan. 17. Reports of officers and committees were presented and the retiring President, Mr. Alex. Dempster, made a brief address. The following are the officers for 1888: President, Alexander Dempster (re-elected); Vice-Presidents, John A. Brashear and W. L. Scaife; Secretary, S. M. Wickersham; Treasurer, A. E. Frost. A paper by T. J. Bray, on Welded Steel Tubes, was read and discussed.

Civil Engineers' Club of Cleveland.

A regular meeting was held Jan. 10. Resolutions of respect to Mr. Holloway on the occasion of his removal from Cleveland to New York were adopted, and a recommendation was made that he be elected an honorary member. Mr. Charles Latimer read a paper on Elevation of the Outer Rail on Curves.

Engineers' Club of St. Louis.

The 286th meeting was held Feb. 1. The committee appointed at the last meeting to report to the club suitable action on Mr. Waddell's efforts to reform the present practice in building highway bridges reported a resolution that the club express its approval of his pamphlet entitled "General Specifications," etc., and deem it a well-considered effort to bring about a much needed reform; that the club recommends these specifications to the consideration of county and town boards; that in the letting of highway bridge contracts and in the acceptance of the finished structures local boards should in all cases call to their aid the services of a competent civil engineer. The report was accepted and the committee discharged, and after some discussion the report was laid on the table, to be called up in two weeks. A resolution was unanimously adopted requesting the committees of the two houses of Congress to insert in the next appropriation bill an item to cover the cost of self-registering rain gauges, to be provided to the signal service observers at all stations. Mr. Carl Gayler read a paper on highway bridge floors, giving standard designs. Mr. B. F. Crow read a paper on construction accounts, showing how the cost of material and labor required to provide each part of a street car is found by means of labor and material accounts. Blank forms were shown and the method described in detail.

American Society of Civil Engineers.

A paper by Gratz Mordecai on the Classification of Railroad Accounts and the Analysis of Railroad Rates was read. This paper, which embodies some results of studies undertaken at the request of the United States Commissioner of Labor, Mr. Carroll D. Wright, based on the papers of Messrs. Albert Fink and O. Chanute, and the returns of various roads, is accompanied by tables showing the general scheme and special examples. In these tables the cost of capital is taken as the sum of all fixed charges, and no attempt is made to arrive at the total cost or value of a railroad and its equipment; hence profit and loss represent the return on the capital invested by stockholders.

The author, after stating that it is and always will be impossible to give the exact cost of even the simple operating and soliciting work of moving an article between two given points, proceeds to detail, in a general way, his method. First the fixed charges chargeable to the freight traffic are divided by the yearly ton-mileage, and this result is multiplied by the number of miles the special article is moved, giving the cost of capital chargeable to that movement. Car services and interest charges are charged against road work, but rentals and other charges exclusively against terminal work are divided per ton handled and added. Thus the cost of superintendence, labor, agents, etc., is treated as the fixed charges were. The sum giving the total cost of labor chargeable to the special movement, to which is added the proportion of the cost of fuel, supplied rolling stock and other repairs, and from the total sum so obtained is substracted the proper proportion of the total incidental receipts, giving the approximate net cost of operating that special movement. A similar method is adopted with the cost of soliciting.

Table three gives the cost of moving a barrel of flour from Minneapolis to a freight pier in New York City, and the result is a loss to the railroads. Refering to this Mr. Mordecai says: "But it must be noticed that this is less than the cost of the fixed charges chargeable to this work, hence the difference is the amount earned from this movement towards paying the fixed charges, and therefore this rate is justified, especially when we consider the large yearly movement and the resulting burden which would be thrown on the traffic if this movement were abandoned by the trunk line railroads."

An interesting strata map of a portion of the United States was exhibited and explained. This map is made up of an ingeniously devised arrangement of layers of paper, differently colored, showing the respective geological strata, from the oldest to the latest.

At the request of the Chair, Mr. T. C. Clarke described how Messrs. Bogart, Upjohn and himself had recently made an examination of the ceiling of the Assembly chamber at Albany. Mr. Clarke said that they had found the ceiling in a very bad condition. That there had been an idea of put-

ting up a wire netting, to prevent the fragments of stone that were constantly splintering off from falling on the heads of the people below, but upon the examination by the committee it was found, as is already known, that the whole ceiling would have to come down. The committee found all of the ribs of the ceiling cracked, and evidence that this cracking was constantly going on; in fact, the walls of the building are cracked in every direction. What is going to be done about it the committee are not yet prepared to say.

Western Railway Club.

The club met Wednesday afternoon at the Grand Pacific Hotel, Chicago. President Rhodes being absent, Mr. Geo. Sargent was elected chairman.

The paper of the day was, "The Effect of Magnetism on Watches," introduced by E. M. Herr (Chicago, Burlington & Quincy). This paper was thoroughly scientific and called forth considerable discussion.

The question of a standard axle for a 60,000 lb. car was taken up and generally discussed, without resulting in recommendation. Mr. J. N. Barr (Chicago, Milwaukee & St. Paul) was unable to be present, and his paper on "The Advantages of Using Six-wheel Trucks Under Freight Cars of 60,000 lbs. Capacity," went over to the March meeting.

PERSONAL.

—Mr. S. De Bow, General Manager of the California Fast Freight Line, died at Chicago, Feb. 8.

—Benjamin W Hobart, for twenty years depot master for the Boston & Albany, at Boston, and connected with the road in various capacities for many years before that, died of heart disease this week.

—Mr. Onward Bates, who has been appointed Superintendent of Bridges and Building, of the Chicago, Milwaukee & St. Paul, was the representative of the Edge Moor Iron Works, Wilmington, Del., in Australia for two years.

—George H. Williams, who has been connected with the New York & New England for sixteen years, has tendered his resignation as General Freight Agent of that company, to take effect March 15. It is said that Mr. Williams resigns to accept a position with one of the larger trunk lines.

—Mr. F. Rosenberg, of Huntingdon, Pa., Supervisor of the seventh sub-division of the Harrisburg-Altoona Division of the Pennsylvania, was the recipient of the $100 prize for general excellence of track and permanent way of his 35-mile division at the last annual inspection. He also received a complimentary letter from the directors.

—Samuel Burke Hynes, who has been appointed General Freight Agent of the Atchison, Topeka & Santa Fe, succeeding J. S. Leeds, who resigned to accept the position of Chairman of the Transcontinental Association, is 45 years old, having entered the service of the company in 1874. Mr. Hynes has been General Agent of the company in St. Louis and Chicago, and was General Passenger and Freight Agent of the Kansas City, Lawrence & Southern Kansas. Since September, 1883, he has held the same position with the Southern Kansas.

ELECTIONS AND APPOINTMENTS.

Alabama & Great Northwestern.—The officers of this company are: President, E. H. Joseph, Montgomery, Ala.; Vice-President, J. W. Woolfolk, Montgomery, Ala.; Secretary and Treasurer, W. G. Hutcheson, Montgomery; Chief Engineer, Belton Mickle, Sheffield, Ala.

Alabama Midland.—The directors of this company are O. C. Wiley, A. St. C Tennille, L Henderson, Troy, Ala.; W. F. Joseph, Josiah Morris, Montgomery; John R. Kilby, Newton, Ala.; John W. Dowling, Ozark, Ala.; and A. T. C. Dickerson.

Atlantic & Pacific.—A. A. Gaddis has been appointed General Superintendent, with headquarters at Albuquerque, N. M., vice J. H. Scott, resigned.

Atchison, Topeka & Santa Fe.—Samuel B. Hynes has been appointed General Freight Agent, with headquarters at Topeka, Kan., vice J. S. Leeds, resigned. In addition to his other duties he will also fill the position of Purchasing Agent, vice A. C. Armstrong.

Augusta & Chattanooga.—At the annual meeting in Augusta last week the following directors were elected: C. A. Evans, Alfred Baker, W. N. Mercer, W. B. Young, W. A. Latimer, J. P. Verdery, P. Walsh, Jesse Thompson, John S. Davidson, D. C. Hill and J. A. Sutton, of Wilkes County, Ga.; W. H. Tutt and J. W. Oslin, of Gainesville, Ga. The following officers were elected: President, C. A. Evans; Secretary and Treasurer, W. B. Young.

Augusta, Gibson & Sandersville.—At the annual meeting held in Augusta, Ga., last week, the following directors were elected: R M. Mitchell, W. B. Young, Thomas Worthen, James K. Hines, George W. Stetson, James J. Davis, Charles H. Howard, Joshua A. Smith, W. T. Garry, James Stapleton, N. W. Murphy, John B. Williams, and W. J. Pollard. The directors elected R. M. Mitchell President.

Birmingham, Selma & New Orleans.—The officers of this company are as follows: President, A. H. Jones; Superintendent and Treasurer, A. M. Fowlkes; Roadmaster, S. D. Killian, of Selma, Ala.

California Southern.—D. McCool, General Manager of the St. Joseph & Grand Island, has been appointed General Manager of this road and of the California Central.

Canadian Pacific.—At a special meeting of directors, held Feb. 8, J. J. C. Abbott, Mayor of Montreal, was elected a director. It was decided to construct the line from Sudbury Junction to Claremont, Ont., shortening the distance between Toronto and Sault Ste. Marie or Port Arthur 70 miles. It is said that work will be begun at once on this line.

Chicago, Milwaukee & St. Paul.—Onward Bates has been appointed Engineer and Superintendent of Bridges and Buildings, with office at Milwaukee, Wis.

Cincinnati, Jackson & Mackinaw.—G. H. Happner has been appointed Freight and Ticket Accountant, with office at Van Wert, O., vice F. C. Cheney, resigned.

Colorado Midland.—George C. Allen has been elected Second Vice-President, vice O. Metcalf, resigned. J. A. Hayes has been elected a director to fill the vacancy caused by the resignation of Mr. Metcalf.

Continental Fast Freight Line.—H. J. Graham has been appointed General and Traveling Agent at Peoria, Ill., vice A. F. Banks, resigned.

Dallas & New Orleans.—The officers of this Texas company are as follows: James B. Simpson, Dallas, Tex., President; Mercer L. Robertson, Secretary; Thomas J. Oliver, Treasurer.

Duluth, Northwestern & Winnipeg.—R. S. Munger, Duluth, Minn., has been elected President of this recently incorporated Minnesota company, and J. B. Holmes, Stillwater, Minn., has been elected Vice-President.

Great Eastern of Canada.—At the annual meeting, held in Montreal, the following directors were elected: James Cooper, A. B. Chaffe, L. A. Massua, R. Prefontaine, F. Vanasse, C. B. Carter and T. T. Turnbull. Mr. Cooper was elected President.

Hutchison, Ashland & Neutral Strip.—The incorporators of this newly incorporated company are: Thomas E. Berry, Geo. Theis, Jr., Charles B. Woodbury, C. F. Winton, Isaac K. Berry, Alpheus J. Kinnear, George A. Blair, William A. McCartney and Joslin I. Lee, of Ashland, Kan.

Isbell & Iron Mountain.—The following are the officers of this Florida company: President, C. H. Castle, Quincy, Ill.; Vice-President, J. P. Boyd, Quincy, Ill.; Secretary, W. H. Nance, Russellville, Ala.; General Manager, John E. Isbell, Isbell, Ala.

Kansas City, Fort Scott & Springfield.—The directors of this consolidated road are: H. H. Hunnewell, Charles Merriam, Nathan Taylor, Sidney Bartlett, Francis Bartlett, T. J. Coolidge, John A. Burnham, B. P. Cheney and E. V. R. Thayer, of Boston; Charles W. Blair and B. P. McDonald, of Fort Scott, Kan.; O. E. Learnard, of Lawrence, Kan., and George H. Nettleton, of Kansas City.

Kansas City & Sabine Pass.—The officers of this road are as follows: President, H. M. James; Vice-President, F. H. Day, New York; Chief Engineer, John W. Weir, of Kansas City, Mo.

Kansas Valley.—At the annual meeting, held in Junction City last week, the following directors were elected: W. B. Clarke, of Kansas City; Thomas A. Osborne, of Topeka; John B. Anderson, L. B. Elliot and S. M. Fox, of Manhattan, Kan.; B. Rockwell, S. D. Carr, A. L. Barnes, George W. Martin, John K. Wright, A. H. Bartell, R. M. Gage, of Junction City, Kan., and Theodore Mosher, of Abilene, Kan. The directors elected the following officers: President, Thomas A. Osborne, Topeka; Vice-President, John K. Wright; Secretary, A. L. Barnes, Junction City, and Treasurer, Theodore Mosher, Abilene.

Los Angeles, Colton & Eastern.—The incorporators of this California company are: Edward Records, C. F. Van Brunck, Maurice Clark, George W. Parsons and D. A. Fiske.

Louisville & Nashville.—John L. Calman has been appointed Superintendent of the Road Department.

Lynchburg & Durham.—The directors of this company are Jacob H. Franklin, J. R. Clark, Adam W. Nowlin, John B. Winfree, R. L. Miller, George M Jones, Lynchburg, Va.; John Hickson, Edward Irvine, R. W. Withers, Campbell County; H. G. Edmondson, Joseph Stebbins, R. W. Watkins, Halifax County; J. A. Long, Person County; E. J. Parrish, G. W. Watts, Durham County. Peter J. Otey, Lynchburg, Va., is President; Wood Bouldin, Jr., Halifax, and Julien S. Carr, Durham, N. C., Vice-Presidents; A. McDonald, Lynchburg, Secretary and Treasurer, and J. W. Goodwin, Lynchburg, is Chief Engineer.

Marietta & North Georgia.—The officers of this road are: R. M. Pulsifer, President, Boston, Mass.; J. U. Jackson, Vice-President, Augusta, Ga.; J. B. Glover, General Superintendent and Treasurer, Marietta; F. B. Chandler, General Freight and Passenger Agent, Marietta.

Mexican Central.—C. E. Halbert has been appointed Trainmaster of the Guadalajara Branch.

Missouri Pacific.—Alexander S. Cochran, of St. Louis, has been appointed General Solicitor.

Moncton & Batouche.—The directors of this reorganized company are: A. E. Killam, M. P., John L. Harris, of Moncton; A. Renaud, of Kent County; C. Ford Stevens, of Philadelphia, and C. N. Skinner, M. P., of St. Johns, New Brunswick. The following officers were elected: President, Lewis de Bertram, Brooklyn, N. Y.; Secretary and Treasurer, Mr. Williamson, C. E.

New York, Lake Erie & Western.—President King's official circular announcing the appointment of a second vice-president is as follows: Mr. E. B. Thomas has been elected Second Vice-President of this company, and placed in charge of its lines west of Salamanca, with headquarters at Cleveland, O. The jurisdiction of the general manager will hereafter be confined to the lines of the Erie proper.

Ohio & Northwestern.—At the recent annual meeting held in Cincinnati the following directors were elected: Geo. Davis, Wells A. Hutchins and James W. Bannon, Portsmouth, O.; John L. Vance, Gallipolis, O.; Henry B. Morehead, Louis G. Weir, Robert B. Bowler and Henry Lewis, Cincinnati; Seth W. Wilson, Philadelphia, Pa.; Geo. West, Ballston, N. Y.; Clifford S. Sims, Mt. Holly, N. J.; Henry C. Parsons, Natural Bridge, Va.; Warner Miller, Herkimer, N. Y.; John W. Simpson and David S. Walton, New York City. The directors organized by electing George West President, and Samuel Hunt General Manager, vice E. C. Pechin.

Pensacola Short Line.—The incorporators of this Florida company are: John McNulta, Bloomington, Ill.; Samuel W. Allerton, David Dudley Rider and Seymour Coleman, of Chicago, and F. C. Brent, B. R. Pitt and H. G. S. Baird, of Pensacola, Fla.

Philadelphia & Erie.—At the annual meeting held in Philadelphia this week the old board of directors were elected as follows: W. Hassell Wilson, J. N. Du Barry, Wistar Morris, Samuel Gustine Thompson, John P. Wetherill, N. Parker Shortridge, Henry D. Welsh, William J. Howard, William L. Elkins, Edmund Smith.

Pittsburgh, Shenango & Lake Erie.—M. P. Frost, of New York, has been elected President of this company and J. T. Blair General Manager.

Quincy, Omaha & Kansas City.—The directors of this reorganized company are: C. H. Bull, Amos Green, W. S. Warfield and W. L. Distin, of Quincy, Ill.; John Paton, Edwin Parsons and W. W. Jacobs, of New York. The directors organized by electing the following officers: President, C. H. Bull; Vice-President and General Manager, Amos Green, Quincy, Ill.; Secretary and Treasurer, E. J. Parker; Superintendent, F. D. Schermerhorn.

Romney & Short Mountain.—The officers of the company, lately incorporated in West Virginia, are: Robert W. Monroe, President; C. S. White, Secretary; R. W. Dailey, Jr., Treasurer.

St. John & Eastern.—At the annual meeting last week the following directors were elected: A. E. Killam, M. P. P., Louis G. de Bertram, W. H. Rourke, Wm. Pugsley, M. P. P., and Charles Jones. The following officers were also elected: President, A. E. Killam, M. P. P.; Chief Engineer, William Murdoch.

St. Joseph, St. Louis & Santa Fe.—M. R. Kiley has been appointed Master Mechanic of this consolidated company, with headquarters at St. Joseph, Mo.

St. Louis & Springfield.—The incorporators of this Illinois company are: L. S. Graves, A. J. Moorsehead, T. T. Witman, W. O. Browning, and L. L. Chapman, of Springfield.

St. Paul, Alexander, Jennings, Lake Arthur & Gulf.—The following directors of this Louisiana company have been elected: A. D. McFarlain, Wm. H. Harris, D. Duroum, S. L. Cary, C. Herbert, E. Dechamps, Jr., V. Ledoux, D. D. Andrus, W. F. Danields, W. Cary, D. E. Sweet, L. S. Cutting and E. R. Shankland. The directors organized by electing the following officers: President, E. R. Shankland; Vice-President, D. Duroum; Secretary, William Cary; Treasurer, W. F. Danields.

St. Paul, Minneapolis & Manitoba.—C. H. Russell has been appointed General Agent at Minneapolis.

Savannah, Florida & Western.—A. A. Avellhe, Assistant Superintendent, will hereafter assume the duties of Purchasing Agent.

Schuylkill Navigation Co.—At the annual meeting held in Philadelphia this week the following officers were elected: President, Harry F. Weht; Managers, George Brooke, Samuel G. Thompson, John B. Garrett, Henry A. Dupont, Edward C. Knight, Beauveau Borie; Treasurer, Richard Wilkins; Secretary, Fred. T. Hallowell.

Waukena, Tulare & Mammoth Forest.—The directors of this newly incorporated California company are: Jason G. Miller, Stephen Townsend, Frank S. Wallace, Charles W. Buchanan, W. P. Hammond, E. A. Brealy, J. H. Moody, A. T. Cotton and B. A. Farmer.

Wheeling & Lake Erie.—George J. Forrest has been elected President of this company.

Wisconsin Central.—Louis Eckstein has been appointed Assistant General Passenger and Ticket Agent.

Zanesville, Newcomerstown & Cleveland.—The directors of this company are: Willis Bailey, Edmund Turner, Benjamin Wheeler, Edward Spencer, Zanesville, O.; A. M. Beers, Newcomerstown, O.; H. H. Squair, Cincinnati, O.; J. W. Flotcher, Nashville, Tenn. The following officers have been elected: President, Willis Bailey; Vice-President, A. M. Beers; General Manager, E. Turner; Treasurer, B. Wheeler; Secretary, D. B. Linn.

OLD AND NEW ROADS.

Alabama & Great Northwestern.—The location for this road has been completed to Maplesville, Chilton County, Ala., on the line of the East Tennessee, Virginia & Georgia, about 50 miles northwest of Montgomery. The contracts for the construction of the road have not yet been let. The road extends from Montgomery via Tuscaloosa, Ala., to Tupelo, Miss. The officers are given in another column.

Alabama Midland.—The surveys for this road have all been completed, the greater part located and the right of way secured. The Alabama Terminal & Improvement Co., J. W. Woolfolk, President, Montgomery, Ala., will construct and operate the road: Mr. Woolfolk is now in New York making arrangements for sub-letting the contract. The road extends from Bainbridge, Ga., to Montgomery, Ala., via Trojan and Ozark, 175 miles, and is an extension of the Savannah, Florida & Western.

Anniston & Cincinnati.—The track on this road has been laid beyond Alexandria, Calhoun County, Ala., about 10 miles from Anniston, and it is expected that it will reach Atalla, 25 miles further on, by April 1.

Atchison, Topeka & Santa Fe.—It is stated that the extension of this road between San Diego and Los Angeles, Cal., will be completed by March 1, and that it may be used as the main between San Diego and the East, and making the Californian Southern from San Bernardino a local line only.

The company has opened an extension in California between San Bernardino and Lugonia, a distance of 8½ miles.

Baltimore & Sparrow Point.—The greater part of the right of way for this road has been secured, and construction work will be commenced in the spring. It was incorporated last August to build a road from Baltimore to the works of the Pennsylvania Steel Co., at Sparrow Point.

Brockville, Westport & Sault Ste. Marie.—This road, extending from Brockville, Ont., on the line of the Grand Trunk, west to Westport, near the Rideau River, is completed with the exception of about 10 miles between Farmersville and Delta, which, it is expected, will be finished by the end of this month. The road crosses the Rideau River at Newborough. It is expected that the entire line will be in operation by March 1.

Burlington, Stillwater & Duluth.—It is said that the construction of this road will soon commence. It was incorporated last November to build a line from a connection with the Chicago, Burlington & Northern, at Prescott, Pierce County, Wis., a few miles below St. Paul, north along the east bank of the St. Croix River to Stillwater, Minn., and then north by an independent line to Duluth, Minn.

Carolina, Knoxville & Western.—It is expected that the grading on the 50 miles of this road between Knoxville, Tenn., and Greenville, S. C., recently let to the Georgia Construction Company, of Augusta, Ga., will be commenced in a week or two. Part of the work will be done by sub-contract.

The contract to build 58 miles of this road in Tennessee has been let to Brown & Fortune, Asheville, N. C., and 82 miles in North Carolina to D. L. Boyd, Newport. It is expected that work on both contracts will commence soon.

Charleston, Cincinnati & Chicago.—The track is being laid on this road at the rate of a mile a day, and it is expected that it will reach Lancaster, S. C., by the end of this month.

Chattanooga, Hiawasse & Augusta.—The survey for this road has been completed and construction work will commence soon. The road is projected to extend from Chattanooga, Tenn., to Murphy, N. C., 97 miles, then to Toccoa, Ga., on the Richmond & Danville, 70 miles.

Chesapeake & Ohio.—The plan of reorganization of this company is published. It is proposed to issue new securities as follows: $30,000,000 consolidated 5 per cent. mortgage bonds, $24,000,000 preferred stock, and $40,000,000 common stock. These securities are not only for the conversion of the existing debt and stock and to cover assessments to be paid on existing stock, but also to take up and complete the work of building the line from Ashland to Cincinnati and a bridge across the Ohio at the latter point. It is estimated that this line and bridge will cost about $8,800,000, and it is

said that a syndicate has been formed to guarantee the required funds for the new work. The reorganization contemplates the reduction of fixed charges to something like the present net earnings, irrespective of the new line, which it is thought will add largely to the earning capacity of the reorganized company. The new securities will represent an ownership of the present line from Newport News to the Big Sandy River and of the new line and bridge from Ashland to Cincinnati. In case this new line should cost over $8,800,000, additional preferred stock will be issued for and taken in payment of the excess. All assessments not paid by stockholders will be paid by the syndicate, which will receive therefor the securities forfeited by the delinquents. Voting power on the new stock will be vested for five years in J. Pierpont Morgan, John Crosby Brown and George Bliss.

The Virginia Legislature has authorized the Board of Public Works to dispose of 17,621 shares of this company's stock held by the state, and for which an offer of $2.50 a share has been made.

Chester & St. Genevieve.—A mortgage for $54,000 has been filed in Illinois by this company on its property between Chester and Centralia, Ill., in favor of the Farmers' Loan & Trust Co., of New York. It is believed that the road will be completed to Centralia very soon. Terre Haute has subscribed $50,000 to aid in the completion of the road to that city, and will also vote, the latter part of this month, on the proposition to subscribe $150,000 to the company.

Chicago & Alton.—It is stated that this company will begin immediately to double-track the road between Bloomington and Odell, Ill., completing the double track from Chicago to Bloomington.

Chicago, Burlington & Quincy.—It is said that M. J. Fitzgerald, Nebraska City, Neb., has received orders to put a force at work to build a road to connect Ashland and Nebraska City, about 40 miles, to be completed within four months.

Chicago, Rock Island & Pacific.—Captain M. O. Hall has just finished a preliminary survey for this road, from Abilene, Tex., via Albany and Archer City, to Wichita Falls, a distance of about 135 miles.

Chicago, Santa Fe & California.—The engineers working on the Chicago, Santa Fe & California recently claimed increased pay and allowances. A conference was held between Mr. C. W. Smith, the Vice-President of the road, and other officers and representatives of the engineers. The differences were amicably adjusted and it was agreed that no rates should be fixed until the through line between Chicago and Kansas City is ready for general traffic. Meanwhile the employés will be paid wages which are as favorable in every respect as those paid by neighboring roads.

Chino Valley.—The rails to complete this narrow-gauge road from Chino to Ontario, San Bernardino County, Cal., have arrived, and it is expected that they will be laid within two weeks.

Choctaw Railroad & Coal.—Incorporated in Texas to build a road from a point in Grayson County southwest to a connection with the Denver, Texas & Fort Worth, in Wise County. It will be a continuation of the Choctaw Railroad & Coal Company lately incorporated in the Indian Territory.

Cincinnati, Selma & Mobile.—The engineers have completed the survey between Hamburg and Selma, and construction work will commence soon.

Columbus, Kinkora & Springfield.—It is said that the Pennsylvania will arrange to renew the lease of this road. It extends from Kinkora to New Lisbon, N. J., 14 miles.

Columbus Southern.—The grading on this road, which is to extend from Columbus, Ga., to Albany, and thence to Brunswick, has commenced and five miles of it have been finished. It is expected that the road will be completed during May.

Coshocton & Southern.—This company has been organized to extend the Cleveland & Canton from Coshocton, its present terminus, south to Zanesville, O., 30 miles. Two miles of the track have been laid, and it is expected that it will be completed to Zanesville by July 1. The stockholders of the Cleveland & Canton have been asked to subscribe to the 30-year 5 per cent. bonds of this company.

Dallas & New Orleans.—It is said that the contracts for this road will be let within two or three months. The company was recently chartered in Texas to build a road from Fort Worth, Tex., to Dallas, and then southeast to New Orleans. The names of the officers are given in another column.

Danville & East Tennessee.—Articles of incorporation have been filed in Virginia for a company of this name.

Danville & North Carolina.—This company has filed a charter in Virginia.

Decatur, Cincinnati & New Orleans.—Shelbyville, Tenn., has voted a subscription of $35,000 to the capital stock of this company.

Delphos & Northwestern.—This company, whose incorporation was announced last week, will build a road from Delphos, Van Wert County, Ohio, in the northwest part of the state, to Paulding, a distance of 25 miles. The officers have not yet been elected, but C. W. Risley, Delphos, Ohio, can give information.

Denison & Washita Valley.—The survey for this road north of the Red River in Indian Territory has been completed for 70 miles, leaving but 10 miles to finish the road to the coal fields near Lehigh, Indian Ter. W. E. Springall, Dallas, Tex., has the contract to build this extension. Construction work is expected to begin within a month or so.

Duluth, Huron & Denver.—The grading of this road from Sauk Centre, Minn., southwest to the state line, 90 miles, has been finished, and the line is ready for tracklaying. It is said that the contract has been let for the building of an independent line to Duluth from Sauk Centre, and that the Northern Pacific tracks will be used under a traffic agreement until this line is completed.

Duluth, Red Wing & Southern.—It is said that the Construction Company which is to build this road has obtained sufficient funds to complete the line from Sioux City, Iowa, to River Falls, Wis., to which point the survey has been finished.

The city of Duluth, Minn., has been asked to subscribe $75,000 to the capital stock of the construction company. The road is projected to extend from Red Wing, Minn., up the left bank of the Mississippi and St. Croix rivers and thence to Duluth.

It is reported that a corps of surveyors are running short lines from Wakefield, Bessemer and Ironwood, in the Gogebic region, to the main line of this road.

Duluth, Wilmar & Sioux Falls.—Grading on this extension of the St. Paul, Minneapolis & Manitoba has been finished to Sioux Falls, Dak., and it is expected that tracklaying will be commenced in the spring. It is believed that the road will cross the Missouri River twice, at Yankton, Dak., and Wheeler.

East Louisiana.—This road has been completed to Claiborne, opposite Covington, St. Tammany County, in the southeastern part of the state, near Lake Pontchartrain. The road had been previously completed from New Orleans to Abita Springs, 21 miles, and is now in operation between New Orleans and Covington.

Evansville, Suburban & Newburg.—This company, incorporated last December in Indiana, has been voted a subsidy by Ohio Township, Warrick County. It is stated that the company will commence construction work very soon. The road is projected to extend from Newburgh, Warrick County, Ind., southeasterly to Rockport, Spencer County, via Eureka and Yankeetown and then to Owensboro, Ky., over the bridge to be erected by the Vincennes, Oakland City & Owensboro.

Farmville & Powhatan.—A bill has passed the Virginia Legislature authorizing the counties of Powhatan and Cumberland to change the form of the bonds which they have subscribed to this road.

Gainesville & Dahlonega.—Work is expected to commence on this Georgia road by March 1.

Galveston Air Line.—The engineers have finished the location of 150 miles of this Texas road, and are now at work locating the rest of the line. W. L. Moody, Galveston, Tex., is President.

Georgia, Carolina & Northern.—This road has been located between Chester, S. C., and Atlanta, Ga. When completed, it will be 270 miles long. The contracts have been let for the greater part of the line and construction is going on actively.

Hutchinson, Ashland & Neutral Strip.—Articles of incorporation have been filed in Kansas to build a road from Hutchinson, on the line of the Atchison, Topeka & Santa Fe, in Reno County, southwest through the counties of Reno, Pratt, Kiowa, Comanche and Clarke, into the public land strip to Palladora City. The capital stock is $500,000.

Illinois Central.—It is reported that this company's Cherokee & Dakota line, which was completed to Sioux Falls, Dak., last December, will be continued in a northwesterly direction.

Kansas City, Fort Scott & Springfield.—Articles of consolidation have been filed in Kansas by the Kansas City, Fort Scott & Gulf, Rich Hill, Short Creek & Joplin, Kansas & Missouri, Fort Scott, Southeastern & Memphis, and the Memphis, Kansas & Colorado, under the above name, with a capital stock of $20,000,000. The five last named are controlled by the Kansas City, Fort Scott & Gulf. It is also reported that the Kansas City, Springfield & Memphis is to be consolidated with this system, thus bringing the entire line from Kansas City to Memphis, which is owned in the same interest, under a single management.

Kansas City & Sabine Pass.—At a meeting in Kansas City last week, the stockholders voted to increase the capital stock from $2,500,000 to $3,000,000, and the bonded indebtedness from $2,243,000 to $3,000,000. The contracts for 117 miles of the road, between Kansas City and Pierce City, Mo., were approved, and it is said that work will begin in the spring. This is a projected road from Kansas City, Mo., to Sabine Pass, a distance of 700 miles.

Work is expected to commence on this road in the spring. It is said that the north end from Kansas City to Bates County will be built first. The preliminary surveys have already been made and a large part of the right of way secured. The officers are given in another column.

Kansas City, Springfield & Memphis.—Articles of agreement for the purchase by this road of the Springfield & Western Missouri, which is leased to the Fort Scott, Southeastern & Memphis, and that part of the latter road which lies in Missouri, have been filed in Missouri.

Kansas Midland.—It is reported that a lumber company has attached eight station buildings of this company, and placed officers in charge, claiming payment for lumber used in construction. The road is a branch of the St. Louis & San Francisco, and was lately opened for business between Wichita and Ellsworth, Kan., a distance of 104 miles.

Lexington & Madison.—A bill has been introduced in the Kentucky Legislature to incorporate this company to build a road from a point opposite Madison, Ind., to Lexington. L. O. Cox and others, incorporators.

Lookout Mountain.—Work has been temporarily abandoned on this standard gauge road, which is being built up Lookout Mountain, Chattanooga, Tenn. It is expected that work will commence again in the spring. Nearly the whole line has been graded, and it will only require five weeks of work to finish it.

Los Angeles, Colton & Eastern.—Articles of incorporation have been filed in California with a capital stock of $500,000.

Los Angeles, Long Beach & Ocean.—Construction work on this road is being actively pushed, one force working from Long Beach towards Los Alamitos Bay and another towards Los Angeles from Los Alamitos Bay. Another force will be set at work in a week or two. J. W. Green, Los Angeles, Cal., is Secretary.

Lynchburg & Durham.—The surveys for this road have been almost completed, and construction forces are at work on the first ten miles from Lynchburg, Va. The road is projected to extend from Lynchburg to Halifax, South Boston, Roxboro and Durham, N. C., the present terminus, but it will probably be extended on to Merry Oaks. J. R. Surpell & Co., Lynchburg, Va., have the contract for part of the route, and the contract for an additional 41 miles will soon be let. The names and addresses of the officers are given in another column.

Marietta & North Georgia.—This road has been permanently located its entire distance, with the exception of 30 miles, and the right of way has been secured for the whole line. The road is in operation between Marietta, Ga., and Murphy, N. C., 112 miles. The new portion extends from Murphy, N. C., toward Knoxville, and south from Marietta toward Atlanta. The whole line is under contract, and 50 miles have been sublet, and it is expected that the rest will be sublet within two months. The road, it is expected, will be completed within 18 months.

Memphis, Oxford & Columbus.—The company has asked the city of Memphis to subscribe $100,000 to this road. The money is not to be paid until the road has been built and put in operation between Memphis and Columbus, 156 miles. The company also asks that $300,000 be subscribed by the counties of De Soto, Tate, Lafayette, Calhoun, Chickasaw, Clay and Lowndes in Mississippi.

Mississippi.—Bills have been introduced in the legislature to incorporate the Columbus, Fulton & Eastport and Corinth, Birmingham & Bolivar roads.

Mobile & Birmingham.—A large force is at work tracklaying on the gap of 5 miles which remains to complete this road between Selma and Birmingham. It is not expected, however, that the road will be put in operation for two or three months, as the track has not been surfaced.

Nashville, Florence & Sheffield.—Track on this division of the Louisville & Nashville, extending from St. Joseph, Tenn., on the main line, to Florence and Sheffield, Ala., 56 miles, has been laid as far as Ironton. Nearly the whole of the grading has been completed.

New York, Lake Erie & Western.—Among the improvements proposed for the coming season are additional stone ballast, extensive additions to equipment, as already noted, and possible new line. The ballasting of the road with stone will be continued until completed through to Port Jervis, and further renewals will be made of rails on the western and middle divisions. A survey is being made for a new and more direct line from Ridgewood to Suffern. This, with the Bergen County road between Rutherford and Ridgewood, will make the line practically a four-track road between New York & Suffern. A third track between Suffern and Middletown is also talked of. The company has procured land at Hillburn, just beyond Suffern, and will probably remove the round-house and freight station above the junction of the branch road, making room for a much need improvement at Suffern.

It is said that work on the new ore dock of this road in Buffalo will begin as soon as the weather permits. The dock will be about 850 ft long and will cost between $15,000 and $20,000. It is hoped to have it in working order at the opening of navigation.

The Erie and the Delaware & Hudson Canal Co. have jointly formed the "New York Car Trust of 1888," with a capital of $1,500,000.

North Topeka, Silver Lake & Rossville.—This road, which was projected to extend from North Topeka west through Silver Lake to Rossville, Shawnee County, Kan., a distance of 18 miles, has been abandoned. The company asked aid from four townships, but one of them refused it.

Ohio & Northwestern.—The directors have resolved to complete the extension of the main line of this road from Portsmouth to Gallipolis, Gallia County, Ohio, 60 miles. John D. Letcher, Cincinnati, is Chief Engineer.

Omaha, Kansas City & El Paso.—It is stated that work will commence on this road, between Kinsley, Edwards County, Kan., and the southern border of the state, within 30 days. It is also stated that financial arrangements to complete the road have been made.

Pemberton & Hightstown.—It is stated that the Pennsylvania has bought the franchise and properties of this road, extending from Pemberton to Hightstown, N. J., 25 miles, and operated by the Pennsylvania at a rental of 7 per cent. on bonds.

Pensacola & Selma.—Work has commenced on this road, a branch of the Louisville & Nashville, on the unfinished portion between Pine Apple and Repton, Ala., about 30 miles. The road is completed from Selma, Ala., to Pine Apple, and also between Repton and Flomaton, on the Louisville & Nashville, and Pensacola, Fla. It is expected that it will be completed during the summer.

Pensacola Short Line.—A charter for this road has been filed in Florida, to build a road from Mobile, Ala., to Pensacola, Fla. It will be a branch of the Birmingham, Mobile & Navy Cove, extending from Mobile to Navy Cove, on the eastern shore of Mobile Bay, 35 miles.

Philadelphia & Erie.—At the annual meeting held in Philadelphia this week a resolution was adopted authorizing a new issue of 5 per cent. bonds to the amount of $3,000,000, for the purpose of retiring the 7 per cent. bonds of the same amount, which fall due July 1 next. The new bonds are to be secured by the general mortgage dated July 1, 1869, and are to become due July 1, 1920. It was stated that the second track had been extended from Montourville to Muncy.

Pittsburgh, Cincinnati & St. Louis.—A number of important improvements and additions will be made to the shops at Columbus in the spring. A foundry completely equipped will be built at a cost of $36,000. In addition to this a pattern room, storeroom, cleaning and grinding departments will be erected, the former at a cost of $5,400, and the latter at a cost of $2,000. A 120-ft. extension to the blacksmith shop will be made.

Cincinnati papers say that the road will put in an electric block system between Batavia Junction and Cincinnati, 9 miles. Block stations will be built at the Louisville & Nashville Y, Rockwood, Woodburn, Pendleton, Columbia, Linwood, Rendcomb and Batavia Junction.

Pittsburgh, Shenango & Lake Erie.—The name of the Shenango & Allegheny has been changed to the above. The main line of the road extends from Greenville to Hilliard, Pa., 47 miles, and with its branches and leased lines comprises 76 miles of road.

Poughkeepsie & Southern.—It is said that this company, which is to build from the new Poughkeepsie bridge southward, will begin work during April.

Quebec & Lake St. John.—Quebec dispatches state the contractor, H. J. Beemer, has 2,000 men at work on the construction of this road and its branches.

Quincy, Omaha & Kansas City.—The Quincy, Missouri & Pacific has been reorganized under the above name. The road extends from West Quincy, Mo., to Trenton, a distance of 134 miles. The road was part of the Wabash system, but was surrendered to the trustees of the first mortgage in August, 1885, and was sold under foreclosure, May, 1886, and has since been operated by the purchasing committee of the first mortgage bondholders. A contract has been made with the Chicago, Rock Island & Pacific, by which a connection with the latter is secured at Trinidad.

Rocky Fork & Crooke City.—It is said that this company has failed to file a map of its definite location with the Secretary of the Interior, and that the timber which it has cut for the construction of its road has been unlawfully taken. The grading and bridging of the road was lately completed from near Laurel, Mont., on the line of the Northern Pacific to Red Lake.

Rochester & Honeoye Falls.—The surveys for this road, from Rochester to Honeoye Falls, about 16 miles, are in progress and the line is being rapidly located. Work will be commenced during the spring, and it is expected that the road will be in operation by September. It will be extended to Hemlock Lake, about 20 miles, by way of Lima, Livingstone County, and possibly to Hornellsville.

St. Louis, Iron Mountain & Southern.—A corps of engineers are now running a survey for an extension of this road from Hot Springs, Ark., westward.

St. Louis & San Francisco.—Surveying parties have commenced locating the line of this road from Sapulpa, Indian Ter., west to Albuquerque, N. M., on the Atlantic & Pacific.

St. Louis & Springfield.—Articles of incorporation have been filed in Illinois to build a road from Mount Olive, Macoupin County, Ill., southwest to East St. Louis. The capital stock is $1,600,000, and the principal office is to be in Springfield.

St. Paul, Alexandria, Jennings, Lake Arthur & Gulf.—A preliminary survey for this road will be made immediately, starting from Jennings, La., on the line of the Illinois Central.

Santa Rosa & Carquinez.—It is said that the Southern Pacific will transfer a force of 600 men from the San Joaquin Valley to this road. The grading is now completed from Napa Junction and Glen Ellen to within four miles of Santa Rosa.

Seymour & Southwestern.—This Indiana company has completed the preliminary survey of the line between Seymour and Jasper. F. M. Swope, of Seymour, is President.

South Atlantic & Ohio.—This road which is to extend from Bristol, Tenn., to Big Stone Gap in Northwest Virginia has been completed beyond Estellville, Scott County, Va., about 40 miles. It is expected that the road will be extended to Elizabethton, Tenn.

Southern Pacific.—The Sabine & East Texas Division, between Beaumont and Sabine Pass, Tex., 30 miles long, a large portion of which was washed away in the great storm of 1886, has been rebuilt and put in operation.

South Florida.—This road, which extends from Sanford, Fla., to Tampa, 115 miles, with several branches, is being extended to Porto Tampa, Fla., and it is expected that it will be in operation by the end of this month. James E. Ingraham, Sanford, Fla., is President.

Tacoma Southern.—The survey for this road has been completed from Orting, W. T., on the line of the Northern Pacific for 30 miles up the Nisqually Valley.

Union Pacific.—For some time past this road has been making a survey from Eagle Rock and Market Lake, Bingham County, Idaho, northeasterly to the National Park in Wyoming Territory, and it is believed that a standard gauge road will be built.

Virginia.—Bills have been introduced in the Virginia Legislature to incorporate the Hunter's Valley and the Bristol & Danville railroads. Joseph R. Andersen, Bristol, Tenn., and others are incorporators of the last named.

Virginia, North Carolina, Tennessee & Western.—A bill has been introduced in the Virginia Legislature to incorporate this company to build a road from a point in Norfolk County on the Elizabeth River to Riddicksville, Hertford County, N. C., with a capital stock of $500,000, and Thomas Breen, of Knowlton, Pa., as President.

Warrior Coal Fields.—Dunn Bros., Birmingham, Ala., have put a large force at work on their contract between Meridian, Miss., and Gainesville, Ala., 56 miles, and they hope to have it completed by April.

Waukena, Tulare & Mammoth Forest.—Articles of incorporation have been filed by this company in California, with a capital stock of $1,000,000.

Winterville & Pleasant Hill.—It is reported that this road will want rails 25 to 40 lbs. per yard, light locomotive, etc. James M. Smith, Winterville, Oglethorpe County, Ga., is President.

Zanesville, Newcomerstown & Cleveland.—This company was organized in 1886 to build a standard gauge road from Zanesville, O., northeasterly, through the counties of Muskingum, Cosbocton and Tuscarawas, to Mineral Point, in Tuscarawas, a distance of 72½ miles. The permanent location of the road has been made, except that the northern terminus may be changed to Sandyville, and the greater part of the right of way secured. The capital stock will soon be increased. The Baltimore & Ohio and Valley roads have each given traffic guarantees. It is expected that the road will be under construction within 60 days and completed within a year after. The names of the officers are given in another column.

TRAFFIC AND EARNINGS.

School Commutation Rates.

The Railroad Commissioners of Massachusetts have rendered a decision on a petition of citizens along the line of the Boston & Maine, in the vicinity of Newburyport, that season tickets for pupils attending school can be lawfully issued at rates lower than those for regular "commuters," and a recommendation is made that school rates which were in force prior to April, 1887, be re established in accordance with the prayer of the petitioners. The road had claimed that special rates for school children making inter-state trips were prohibited by the Inter-state Commerce law, and that it would not be justified in issuing such tickets within the state while refusing them to scholars traveling from one state to another. The board decides that it is not a necessary conclusion that the Inter-state Commission will, whenever this question shall come before it, hold that special school rates are illegal in inter-state transportation, nor, if the Inter-state Commission should hold that such rates were illegal, that the same within a single state would necessarily be illegal in consequence.

Traffic Notes.

The Canadian Pacific and the Sunset Route (Southern Pacific) are accused of selling second-class tickets from New York to Pacific coast points at several dollars under the agreed rates.

The trunk lines finally agreed on Friday last to discontinue the export tariff which has been experimented with for a few months past. The rates will now be made as formerly, by adding the ocean rate to the inland tariff, the inland rate to Boston on export traffic remaining, as before, on a par with that to New York. Elevator charges on grain at points of export are also to be added. It was resolved that the inland rates be filed with the Inter-state Commerce Commission with a written statement that the through export rates are made by adding such inland rates and elevator charges to the rates of connecting ocean carriers.

There is a report that the rate on live stock from St. Louis east, which has been very low for several weeks, has been advanced from $10.50 to $30 per car by all the lines.

The trunk lines have taken action looking to the establishment of an inspection bureau for the detection of false description and underweighing at the western termini.

It is now stated that the Inter-state Commerce Commission will give a hearing on the matter of the inland transportation of immigrants (the case of James C. Savery & Co. against the trunk lines) on Feb. 21 at Room 45 in the Post-office building, New York City.

The American Live Stock Express Company announces that it is to have built at once in Buffalo 100 of its special stock cars, "fitted with paper wheels, Westinghouse brakes and all the latest appliances for the comfort of stock."

Cotton.

The cotton movement for the week ending Feb. 10 is reported as follows, in bales:

Interior markets:	1888.	1887.	Inc. or Dec.	P. c.
Receipts	42,704	55,048	D. 12,344	24.3
Shipments	53,597	58,862	D. 5,265	8.9
Stock	368,663	332,798	I. 35,865	10.8
Seaports:				
Receipts	99,583	108,257	D. 8,674	7.9
Exports	116,002	113,802	I. 2,200	1.9
Stock	923,683	891,495	I. 32,188	3.6

Coal.

The coal tonnages for the week ending Feb. 11 are reported as follows:

	1888.	1887.	Inc. or Dec.	P. c.
Anthracite	570,077	585,102	D. 15,025	2.5
Bituminous	328,730	273,135	I. 55,595	20.4

The coal tonnages of the Pennsylvania road east of Pittsburgh and Erie, for the week ending Feb. 11, and the year to that date, are as follows:

	Coal.	Coke.	Total.
Total week ending Feb. 11	228,468	62,042	290 510
Total year 1888 to date	1,355,744	482,712	1,838 456
Total year 1887 to same date	1,185,511	529,705	1 715,216

The Cumberland coal trade for the week ending Feb. 11 amounted to 53,289 tons, and for the year to that date, 351,992 tons.

Railroad Earnings.

The statement of the Louisville, New Orleans & Texas, for the year ending Dec. 31, shows:

	1887.	1886.	Inc.
Gross earnings	$2,242,211	$1,811,192	I. $432,019
Oper. expenses	1,521,128	1,252,563	I. 268,565
Net earnings	$722,083	$558,628	I. $163,455

The following is a comparative statement of the Manhattan (Elevated) for the quarter ending Dec. 31:

	1887.	1886.	Inc. or Dec.
Gross earnings	$2,237,039	$2,028,593	I. $208,446
Operating expenses	1,176,977	1,126,285	I. 50,692
Net earnings	$1,060,082	$902,308	I. $157,774
Other income	21,671	17,445	I 4,226
Total income	$1,081,754	$919,753	I. $162,001
Fixed charges	509,356	509,089	D. 5,733
Surplus	$578,398	$410,664	I. $167,734
Cash on hand	198,085	.....	.....
Profit and loss surplus	162,752	.....	.....

The statement of the Western New York & Pennsylvania for the quarter ending Dec. 31, as filed at Albany, shows:

	1887.	1886.	Inc. or Dec.
Gross earnings	$730,759	$630,861	I. $99,898
Operating expenses	573,053	590,616	D. 17,563
Net earnings	$157,706	$40 245	I. $117,461
Other income	.....	13,403	D. 13,403
Fixed charges	60,517	93,470	D. 32,953
Surplus	$97,189	def. $39,811	I. $137,000
Cash on hand	36,096	.....	.....

The following is a comparative statement of the earnings and expenses of the New York, Lake Erie & Western for the quarter ending Dec. 31, as filed at Albany:

	1887.	1886.	Inc. or Dec.
Gross earnings	$7,173,054	$6,887,643	I. $285,411
Oper. expenses	4,557,372	4,197,195	I. 360,177
Net earnings	$2,615,682	$2,690,448	D. $74,766
Due leased lines	650,656	619,123	I. 31,553
Balance	$1,965 026	$2,071,325	D. $106,299
Other income	265,353	282,688	D. 17,335
Total income	$2 230,379	$2 354 013	D. $123,634
Fixed charges	1,845,825	1,877,418	D. 31,593
Surplus	$384,554	$476,595	D. $92,011
Cash on hand	344,723		
Profit and loss sur	7,864,768		

Advance figures of the annual report of the Northern Central, covering the year 1887, show: Gross earnings, $6 212,926; total expenses, $4,139,441; net earnings, $2,073,484, an increase over 1886 of $121,950; total interest and rental payments for year, $1,034,865; cash dividend, $545,946; balance to credit of profit and loss account Dec. 31, 1887, $877,638; coal tonnage increased 551,887 tons; grain traffic decreased, 1,287,518 bushels. Stock dividend of 10 per cent. was declared during the year, amounting to $650,000.

Earnings of railroad lines for various periods are reported as follows:

Month of December:

	1887.	1886.	Inc. or Dec.	P. c.
Cape F. & Y. Vy.	$26,537	$21,339	I. $5,198	24 8
Net	13,156	10,211	I. 2,945	29.5
Chic., B. & Q.	2,163,388	2,368,432	D. 205 044	8,9
Net	936,449	1,227.117	D. 290,668	23.6
Cleve. & Canton	28,804	29,197	D. 393	1.4
Net	7,011	6 484	I. 527	8.1
Den. & R. G	714.134	635,215	I. 78,919	12.3
Net	232,471	260,511	D. 28.040	10.9
Gr Rapids & Ind.	219,499	247,547	D. 28,048	11 2
Net	52 944	99 970	D. 47,026	47.0
Kentucky Cent.	81,137	71,461	I. 9 676	13.8
Net	31,456	20,133	I. 11.323	56.6
L., N. O. & Tex.	330,385	272.376	I. 58.009	21.5
Net	146 551	134.760	I. 11.791	8.7
Mexican Central	540,056	440 980	I 99.076	22.7
Net	286.772	231 916	I. 54.856	23.9
Minn. & St. L.	1 6 414	149,184	D. 22,770	15.2
Net	20,534	52,070	D. 31,536	60.6
New Brunswick	65.568	64,164	I. 1,404	2.2
Net	23.364	22.232	I. 1.132	5 1
Rome, Wat. & Og.	263,806	233,294	I. 30,512	12.8
Net	107,475	104,582	I. 2,893	2.8
Southern Pacific:				
Gal., H. & S. A.	314,878	246,670	I. 68,208	27.6
Net	83.481	16.596	I. 66,885	402.9
Louisiana West.	77,846	66,061	I. 11 785	17.9
Net	38,787	35,211	I. 3,576	10.2
Mor. L. & Texas.	620 732	484 833	I. 135,899	28.0
Net	289,555	175,235	I. 114,320	81.6
N. Y., Tex. & M.	15,536	14,073	I. 1,463	10.5
Net	3,265	546	I. 2,719	498.0
Texas & N. O.	119,126	102,154	I. 16,972	16.6
Net	38,390	51,220	D. 12 830	25.2
Atlantic System	1,148,119	913,792	I. 234,327	25 6
Net	453 478	278,810	I. 174 668	62.6
Pacific System	2,402,977	1,990,754	I. 412,223	20.7
Net	769,680	763,087	I. 6,593	0.9
Tot. So. Pac.	3,551,096	2,904,546	I. 646,550	22.3
Net	1,223 158	1,041,897	I. 181.261	17.4
Union Pacific.	2,243,872	2,343,543	D. 99.671	4.3
Net	764,224	972,817	D. 208,593	21.4
Total (gross)	$10,354.695	$9 781,277	I. $573,418	5.8
Total (net)	3,845,566	4,184,698	D. 618,692	14.8
			I. 279,560	....
Net			D. $339,132	...

Month of January:

	1888.	1887.	Inc. or Dec.	P. c.
Atlantic & Pac.	229.012	207.564	I. 21,448	10.2
Buff., R. & Pitts.	149,623	123,446	I. 26,177	21.3
Bur., C. R. & Nor.	208,244	220 208	D. 11 964	5.4
Cairo, V. & Chic.	54,538	57,721	D. 3,183	5 6
California South.	149.437	124,395	I. 25,042	20.2
Canadian Pac.	803.000	643,493	I. 159,507	24.9
Cape F. & Y. Vy.	27,253	20,713	I. 6,540	32.6
Cent. of Georgia.	486.552	418,198	I. 68 354	13.9
Central of Iowa.	99,745	109,446	D. 9,701	8.8
Ches., O & S. W.	160 759	145,600	I. 15,159	10.4
Chic. & Atlantic.	140.543	138 555	I. 1 988	1.5
Chi. & East. Ill.	157,626	155,063	I. 2,563	1.8
Chi. & Ind. Coal.	43,581	28,412	I. 15,169	54.2
Chi., Mil. & St. P.	1,452.000	1,490 239	D. 38,239	2.6
Chi. & Ohio R.	3,274	6,631	D. 3 357	48 9
Chi., St. P. & K. C.	121.862	82,045	I. 39 817	48.6
Chi., & W. M.	82,111	84,859	D. 2,748	3.2
†Cin., J. & Mack.	22,074	18 521	I. 3,553	18.7
Cin., N. O. & T. P.	277.627	265,194	I. 12.433	4.6
Ala. Gt. South.	136.749	127 791	I. 8,958	6.9
N. Orl. & N. E.	75,049	69.003	I. 6,046	8.6
Vicks. & Mer.	46 066	53,258	D. 7,192	13.3
V., Shre. & P.	47,252	59.699	D. 12,447	20 8
Cin. & Spr. & gt'd.	85 239	85,610	D. 371	0 4
Cin., W. & Balt.	17 ,490	148.861	D. 12,371	6 8
Cleve., Ak. & Col.	42,936	36,760	I. 6,176	16 7
Cl., C., C. & I.	313.436	298,349	I. 15.087	5.0
Cleve. & Mar.	24,904	24,465	I. 439	1.3
Col. & Cin. Mid.	24 693	28,464	D. 3 771	12.6
Col., H. V. & T.	204.518	223,565	D. 19 047	9 5
Den. & R. G.	597.400	545 650	I. 51.750	9.0
Den. & R. G. W.	86.675	71,559	I. 15,116	21.6
†Den. T. & G.	14,969	9,208	I. 5,791	64.3
Det., B. C. & Al.	27,500	24,396	I. 3,104	12.7
Det., Lan. & No.	60 513	70 293	D. 9,780	11.1
†Du., S. S. & At.	74 990	42,778	I. 32,212	74.9
E. Ten., Va. & G.	480.470	422,487	I. 57 983	14.4
Evans. & Ind.	16,277	18,207	D. 1,930	10 7
Ev. & Terre H.	63 436	54 610	I. 8,826	16 0
Flint & P. M.	192 560	171.395	I. 21.165	12.4
†Fla. Ry. & N. Co.	69 470	65,280	I. 4,190	6.0
Ft. Worth & D. C.	61,276	37.619	I. 23,657	62.3
*Ga. Rap. & Ind.	183,403	179,522	I. 3,881	2 2
*Grand Tr. of C.	1,092.354	1,100.446	D. 38,092	3.5
†Hous. & Tex. C.	133,529	161.647	D. 28.118	17.6
Ill. Cen. (Ill. Div.)	529.400	579,694	D. 50,294	9.2
Southern Div.	389,500	380,254	D. 20.754	5.5
Ind., Bloom. & W.	187.365	204.600	D. 15,235	7.6
Ind., Dec. & Spr.	28,471	42,487	D. 14.016	33.3
†K. C., Ft. S. & G.	128,293	151,013	D. 22,720	15 1
†K. C., Sp. & Mem.	83,752	108.933	D. 25.181	28 0
K. C., Cl. & Spr.	13,196	9.427	I. 3,769	40.1
Keok. & West.	29,200	24,545	I. 4,655	18.6
Kings & Pemb.	9,525	6.374	I. 3.151	49.2
Lake E. & W.	143,446	146,386	D. 2 940	2.0
Lehigh & H. R.	17,968	20 912	D. 3.844	18.3
Lt. Rock & Mem.	68,050	81.474	D. 13.424	16 4
Long Island.	174,407	158,851	I. 15,556	9.7
L., E. & St. L.	75,661	64,318	I. 11,343	17.7
Louis. & Nash.	1,283.735	1,228,093	I. 55 642	4.5
L., N., A. & Chi.	135,410	130,417	D. 4,007	3.0
L., N. O. & Tex.	230.012	218,063	I. 11,949	5.4
†Mem. & Char.	110.784	117,021	D. 6 257	5.2
a Mex Central.	505,000	421,820	I. 83,780	19.9
Mil., L. S. & W.	133,434	142.885	D. 9,451	6.8
Mil & Northern.	64,180	64,482	D. 1.302	2 0
Minn. & St. L.	81,000	117,845	D. 36.845	32.1
Mobile & Ohio.	202,118	236,015	D. 33.897	14.1
Nat., Jack. & Col.	15,255	15,641	D. 386	2.4
N. Y. C. & H. R.	2,716,704	2,714,710	I. 1.994	....
N. Y., O. & West.	100,350	90,165	I. 10,194	11.3
Norfolk & West.	349.144	261,656	I. 87,488	33.6
Northern Pacific.	656,386	571,421	I. 84 965	14.9
Ohio & Miss.	289.924	295.219	D. 5,295	1.7
Ohio River.	26 630	18.404	I. 8,226	45.7
Ohio Southern	59, 86	53,476	I. 5,710	10.6
Peoria, Dec. & E.	58 500	70,639	D. 12,139	17 1
Pitts. & West.	117,568	154,106	D. 35,538	23.7
†Rich. & Danville	299,350	257.775	I. 41,575	16.1
†Virginia Midl.	94.375	69 600	I. 24,775	35.4
†Char., Col. & A.	51,300	45,000	I. 6.300	14.0
†Col. & Gr. Div.	41,000	34,825	I. 6,175	17.6
†W. N. Car. Div.	42,075	29,050	I. 13,025	44.9
†Wash., O. & W.	6,875	6,075	I. 800	13 3
†Ashev. & Spa.	5,775	2,500	I. 3,275	131.0
b St. L., A. & T. H.				
Main line	160,689	154,189	I. 6 500	4.3
Branches	78 086	74,085	I. 4,001	5.4
St. L., A. & Tex.	217 654	166,924	I. 51,630	30.4
St. Louis & S. F.	392,693	386,486	I. 6,207	1.6
St. P. & Duluth.	67,854	98,857	D. 31,003	31.3
St. P., M. & Man.	482,421	459,251	I. 23,170	4.6
Shenandoah Val.	50,000	57,288	D. 7,288	12.8
St. L. Rap. Tran.	42,883	40 628	I. 2 255	5.5
Texas & Pacific	557,536	524,569	I. 32,967	6.3
T., A. A. & W. M.	48,368	35,242	I. 13,126	37 5
Tol. & O. Cent.	105,734	85 956	I. 19.778	23 0
Tol., P. & West.	72.511	74,625	D. 2,114	2 8
Wabash West.	414.650	400,895	I. 13,755	3.4
W. N. Y. & Pa.	213.900	189,809	I. 24,091	12.7
Wheeling & L. E.	69,243	51,631	I. 17,612	34.0
¶Wisconsin Cen.	220,709	216 535	I. 4,224	1.9
Total	$21,673,019	$20,873,496	I. $1,310,256	6.4
			D. 510,733	2 5
Net			I. 799,523	3 9

† Includes three weeks only of January in each year.
‡ Including Det., M. & Marq. and Marq., Hough. & Ont.
¶ All lines.
* For four weeks ending Jan. 28.
a Mexican currency.
b Includes Indianapolis & St. Louis.

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

Northwestern Rates.

Freight rates in the Northwest continue in about the same condition reported a week ago. Various cuts, either small in themselves or affecting a small class of traffic, have been reported every day or two. Des Moines has been the pivotal point for many reductions, and places as far away as Atlanta, Ga., and Lincoln, Neb., enjoy slight cuts. The rates between Chicago and Council Bluffs now stand on the basis of 27½ cents first class, and between Chicago and St. Paul at 20 cents first class. As heretofore, the Chicago, St. Paul & Kansas City and the Chicago, Burlington & Northern appear to be the most aggressive combatants in the war. The Minneapolis, Sault Ste. Marie & Atlantic has reduced its New York-St. Paul rates slightly, the latest announcement being on the basis of 85 cents first class.

The trunk lines have kept pretty clear of the fight thus far, the meeting in New York last week deciding to insist on full proportions east of Chicago on all freight, and advancing the rate from Chicago to the seaboard on grain shipped from St. Paul. This freight has for some time been carried at 25 cents, 2½ less than the price charged for shipments from Chicago proper, but it is now advanced to 27½. It is said, however, that large quantities of export grain and provisions are being taken at large reductions from published rates. It was reported on Tuesday that the other three principal lines would refuse to follow the Chicago, Burlington & Quincy's reduction to 12 cents on grain from Omaha to Chicago.

East-bound Shipments.

East-bound through shipments of flour, grain and provisions from Chicago for the week ending Feb. 11 amounted to 49,069 tons, against 52,065 tons the week before. The Chicago & Grand Trunk carried 13.7 per cent.; Michigan Central, 7.7; Lake Shore & Michigan Southern, 20.1; Pittsburgh, Fort Wayne & Chicago, 12.9; Chicago, St. Louis & Pittsburgh, 7; Baltimore & Ohio, 9.6 per cent.